REPORT

GEOTECHNICAL INVESTIGATION

PROPOSED PARKING LOT

(FORMER STORAGE YARD)

San Jose, California

Prepared for

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Woodward-Clyde Consultants
55 South Market Street
Suite 1650
San Jose, California 95113

May 1993

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Woodward-Clyde Consultants

Engineering & sciences applied to the earth & its environment

PROPERTY OF SANTA CLARA VALLEY
WATER DISTRICT
5750 Almaden Expressway
San Jose, California 95118

May 20, 1993

Project 91C-0588-R

Mr. Bruce Wilson
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Re: Geotechnical Investigation Report
Proposed Parking Lot (Former Storage Yard Area)
San Jose, California

Dear Mr. Wilson:

We are pleased to present the accompanying report describing the results of our geotechnical investigation at the site of the proposed employee parking lot for the Santa Clara Valley Water District's new Headquarters Building. We have incorporated the District's review comments since our draft report of April 9, 1993 was issued.

As authorized, we have conducted field explorations and laboratory tests to further quantify the engineering properties of the subsurface soils at the project site. Based on these data, along with previous available data, we have made settlement and preliminary seismic stability evaluations for the cap and cover material as well as the underlying quarry fines material in the former Storage Yard area. Our conclusions and opinions, together with the results of our field exploration and laboratory tests, are also presented in this report.

We appreciate the opportunity to have been of service to the District on this interesting project. If any questions arise, or if we can be of further service, please contact us.

Sincerely,

S. Stephen Huang

S. Stephen Huang
Project Engineer, GE 2150



91C0588R\PARKING.RPT\May 20, 1993\snj

55 South Market Street, Suite 1650 • San Jose, CA 95113 • (408) 297-9585 • Fax: (408) 297-6962

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1.0 INTRODUCTION

This report presents the results of a geotechnical investigation conducted by Woodward-Clyde Consultants (WCC) within the former storage yard area north of the Santa Clara Valley Water District (District) Headquarters Building in San Jose, California. This investigation was conducted concurrently with our environmental study of the site. That study further investigated hydrocarbon compounds previously detected in soil beneath the site. The results of that investigation are presented in a separate report entitled "Supplemental Environmental Investigation, Proposed Parking Lot Expansion Area," dated October 20, 1992, and in subsequent quarterly monitoring reports dated December 22, 1992 and March 19, 1993.

Six (6) borings were drilled for the combined geotechnical and environmental studies to supplement previous exploration at the site. Detailed descriptions of the field exploration and geotechnical laboratory testing performed as a part of this investigation are presented in Appendix A.

1.1 PROJECT DESCRIPTION

We understand that the former Storage Yard site will be developed as an employee parking lot expansion for the District's Headquarters Building. The District has proposed a partial reclamation plan consisting of removing the remaining construction materials from the site and constructing engineered fill material upon which the parking lot will be placed. Based on a discussion with Messrs. Bruce Wilson and Kurt Arends of the District, we understand the proposed parking lot subgrade will range from approximately Elevation 192 to 195 $\pm$. Assuming about 1 foot of pavement section will be placed for the parking lot, the finished grade elevations will be about Elevation 193 to 196 $\pm$. This will necessitate placement of about 1-1/2 to 2-1/2 feet of engineered fill and pavement section over the existing grade of the site. Mr. Wilson has estimated the construction of the proposed parking lot will probably start in 1997.



1.2 PROJECT BACKGROUND

1.2.1 Guadalupe River Improvements Study, 1973

A geotechnical engineering study was conducted for the District in 1973 by our predecessor firm, Woodward-Lundgren and Associates (WLA), for channel improvements to the Guadalupe River located directly east of the site (Figure 1). "Quarry fines material," or "QFM" were found in that area by exploratory borings drilled as a part of that study (WLA 1973). The North Pond (also shown on Figure 1) was constructed along the west side of the Storage Yard at the time of the channel improvements.

1.2.2 Standard Brands Paint Store Investigation, 1976

Geotechnical engineering studies were conducted by Terrasearch, Inc. (1976) for the development of the Standard Brands Paint and Furniture 2000 stores located immediately north of the Storage Yard. The exploration for that study also encountered the QFM. Recommendations were made in the report to remove and replace the QFM with engineered fill. A grading plan prepared by Piazza Properties, Ltd. and dated October 17, 1977 incorporated the recommendation to remove the QFM and replace it with engineered fill compacted to 90 percent relative compaction. The plan showed that the final depth of excavtion in the building area was to be determined by the soils engineer. The plan also required a minimum of 6 feet of the existing materials be excavated below the pavement subgrade level in the parking lot. Bay Soils, Inc. was retained to observe the earthwork operations. Reportedly, the QFM was removed in its entirety beneath the buildings and was partially removed in the paved parking area to the rear. Although considerable effort was made to locate the as-built plans and summary report of Bay Soils' observations and test results, these documents could not be obtained. Therefore, the actual extent of QFM removal could not be ascertained.

1.2.3 Construction of Channel Improvement for Guadalupe River, 1976

During construction of the channel improvements, an excavation along the west river bank (east side of the Storage Yard) triggered a slope failure where the cut exposed the QFM. District records indicate the channel bank subsequently was repaired as a part of the

construction improvements. A District as-built plan, entitled "Plan, Guadalupe River, Blossom Hill Road to Alamitos Creek Confluence, Central Zone," dated May 10, 1976 (with an As-Built stamped date of January 10, 1985), presents the outline of the areas that were repaired. These areas are shown on Figure 1 as hatched areas. A cross-section on the District's drawing shows that a parallelogram shaped buttress of earth fill was constructed for stabilizing the channel bank. Construction photos supplied by the District and presented in Figure 2, show the conditions of the channel bank after the failure and during the repair process. Although records of the actual procedures and materials used in the buttress construction are not available, the photo dated August 23, 1976, suggests the material was relatively granular.

1.2.4 Geotechnical and Environmental Studies for the Storage Yard/North Pond, 1988 to 1991

Woodward-Clyde Consultants (WCC) conducted a geotechnical study at the site of the Storage Yard/North Pond (WCC 1989). The purposes of that study were to estimate the volume of QFM and cap/cover materials, evaluate alternative methods of stabilizing, removing or replacing them as engineered fill, and estimate the costs of these different alternatives.

During a field investigation conducted in October 1990 by the Santa Clara Valley Water District, the cap material at the Storage Yard was sampled and analyzed to determine if chemicals stored at the yard had contaminated the soils. Analyses of the samples indicated the presence of oil and grease in one of the shallow samples. It was hypothesized by the District that the oil and grease were associated with the asphalt surface at the former Storage Yard and not from activities at the Storage Yard.

Woodward-Clyde Consultants completed a limited subsurface environmental field investigation of the Storage Yard and the North Percolation Pond areas in 1991 (WCC 1991). The purpose of that investigation was to identify and document the possible presence of contaminants in the QFM and to classify the material, in a limited preliminary manner.



1.2.5 Supplementary Environmental Investigation, 1992

Petroleum related hydrocarbon contamination was detected in the soil and groundwater samples recovered during the environmental study phase of this investigation (WCC 1992). The following potential mitigation alternatives were identified in our October 20, 1992 report:

- Encapsulation in-place (e.g., capping with a synthetic cover and covering with asphalt)
- Excavation and subsequent encapsulation of on-site materials having concentrations above threshold guideline levels within synthetic and/or natural liners and covers
- Excavation and bio-remediation followed by encapsulation on-site as described above
- Treatment (e.g., physical solidification/stabilization) on-site
- Excavation, treatment, and off-site disposal at an approved disposal facility
- Excavation and off-site disposal at an approved disposal facility

Subsequent quarterly monitoring in November 1992 and February 1993, of wells installed for that study, has revealed there has been minimal impact on the groundwater. This finding appears to confirm that the encapsulation in-place alternative is a feasible way to accomplish the environmental mitigation objectives. The District has indicated this also would be their preferred approach, since it would involve the least site development cost.



2.0
SCOPE

2.1 GEOTECHNICAL ISSUES

From a geotechnical perspective, there are three primary considerations that should be addressed for the intended development of the site:

1) The potential for future settlement of the Quarry Fines Material (QFM).

2) The seismic stability of the QFM and adjacent channel bank during earthquake shaking.

3) Feasible methods for stabilization of the QFM subgrade prior to the placement of engineered fill in the event the existing cap and cover were to be removed prior to parking area pavement construction.

In light of the findings from the Supplementary Environmental Investigation (WCC 1992) and the District's preference, the option of leaving the existing cap and cover materials in place will eliminate the need to stabilize the weak underlying QFM subgrade that would have been exposed if their removal became necessary. However, long-term settlement due to consolidation of the QFM and seismic stability of the river bank and pond side slopes which adjoin the site remain as issues.

2.2 SERVICES PERFORMED

The explorations conducted as part of the previous studies at the site (Figure 1) provided a basis for estimating the thickness and areal extent of the quarry fines, cap material and cover material present at the site. To better quantify the strength and compressibility

characteristics of the site soils, so as to address the aforementioned geotechnical issues, we performed the following tasks:

- Drilled two exploratory borings to depths about 24 feet at strategic locations in the Storage Yard to obtain samples of the cap and cover material and the QFM;
- Performed laboratory tests including moisture content, dry unit weight, unconfined compressive strength, Atterberg's limits, consolidation, and R-value;
- Reviewed existing subsurface data, including previous consolidation test results;
- Performed engineering analysis to estimate past settlement, future total and differential settlement, and time rate of settlement;
- Evaluated potential methods of accelerating the QFM consolidation to minimize post-construction settlement;
- Estimated the potential for liquefaction, and assessed the lateral stability of the QFM during earthquake shaking;
- Developed recommendations for site grading and pavement structural section design.

3.0
SITE AND SUBSURFACE CONDITIONS

3.1 SITE DESCRIPTION

The project area is an approximately 3 acre site identified on Figure 1 as Proposed Parking Lot (Former Storage Yard). Typically, construction materials such as aggregate and pipes were stockpiled on the site surface.

At the time of our field exploration, the Storage Yard was surrounded by a chain-link-fence with an entrance at the southeast corner. The ground was relatively level inside the fenced area. Based upon a topographic map (photo date 3/6/91) supplied by the District, the ground surface elevation ranges from about Elevation 191.1 to 194.5.

A few items had been left on site after the closure of the yard; they included two segments of 60 $\pm$ inch diameter reinforced concrete pipe located near the northern end, a trash bin on the eastern side, two rectangular concrete pad areas near the center (apparently the base slabs for previous aggregate bins that had been razed when the Storage Yard was closed), and a few rectangular metal and wood mats on the south side of the area.

3.2 SUBSURFACE CONDITIONS

Six (6) exploratory borings were drilled for the combined geotechnical and environmental studies of the Storage Yard. Within the fenced area of the Storage Yard site, two (2) exploratory borings (B-1 and B-2) were drilled to depths of about 24 feet to obtain samples for geotechnical laboratory testing and analysis. The other four (4) exploratory borings (E-1, MW-1, MW-2 and MW-3) were drilled for environmental assessment purposes; three borings (MW-1, MW-2 and MW-3) were subsequently converted to groundwater monitoring wells. The approximate locations of these borings are shown on the Site and Boring Location Plan, Figure 1. Descriptions of the soils encountered are shown on the Logs of Borings in Appendix A. A discussion of the subsurface exploration techniques is presented in Appendix A.



Twenty two (22) exploratory borings and eight (8) exploratory pits were made previously within or adjacent to the Storage Yard site (Figure 1). For convenience of reference, the logs of these borings and exploratory pits are presented in Appendix B, along with the results of a consolidation test performed on a sample of the QFM.

Figure 3 presents an idealized cross-section of the site based on available exploratory information. In general, a cap/cover material exists above the QFM which in turn is underlain by dense native gravel deposits.

Borings B-1 and B-2 reveal about 13 and 8-1/2 feet of cap/cover material, respectively. This material consists primarily of clayey gravel with scattered asphalt fragments in a moderately compacted condition. It appears to be a material similar to that revealed in the previous explorations. The depths of the cap/cover also are consistent with those encountered in the previous explorations.

Below the cap/cover material, the borings encountered QFM which was referred to as "slimes" in our previous reports. This material consists primarily of brown to gray, highly plastic clay. It was found to be very soft in consistency and high in compressibility. Moisture contents varied from about 49 to 80 percent, and dry densities were in the range of 52 to 66 pcf. The thicknesses of QFM in Borings B-1 and B-2 are approximately 10-1/2 and 15 feet, respectively. These properties and thicknesses also appear to be consistent with the previous data.

Below the QFM, the borings encountered a native stratum of sandy to clayey gravel at a depth of about 23-1/2 feet. This gravel stratum was found to be dense to very dense.

3.3 GROUNDWATER

Groundwater was encountered at depths of about 24 and 22 feet in Borings B-1 and B-2, respectively. This corresponds to about Elevations 167 to 169 based on interpolation between surface elevation contours on District's (photo date 3/6/91) topographic map. These depths were somewhat lower than the groundwater levels encountered in exploratory borings drilled for previous studies. In the 1973 study, the depths varied between 16 and 18 feet which corresponded to approximately Elevation 172 $\pm$. At the time of the 1988 study,

groundwater was at about depths of 10 to 15 feet; the corresponding elevations were Elevations 179 to 184 $\pm$. More detailed descriptions of the groundwater flow directions and gradients are presented in our Supplementary Environmental Investigation report (WCC 1992).

4.0
GEOTECHNICAL CONCLUSIONS AND RECOMMENDATIONS

Our conclusions and recommendations associated with geotechnical site development considerations are presented in the following sections. They have been based upon our review of available information, supplemental exploration and testing conducted for this study, engineering judgment and local experience.

4.1 SETTLEMENT

4.1.1 Settlement due to Existing Fill and Future Parking Lot Fill

Based on the results of consolidation tests performed on QFM samples recovered from our borings, we estimate about 80 percent of the primary consolidation of the 10 to 15 foot thick QFM has been achieved under the current loading conditions. This means the QFM is under-consolidated, and settlement will continue to occur. We estimate about 4 inches of future settlement are possible under the current loading conditions. The settlement will occur gradually over a period of 10 to 15 years until primary consolidation is complete.

Additional settlement will result from the surcharge load associated with the placement of 1-1/2 to 2-1/2 feet of import fill to raise the parking lot grade. For an assumed fill unit weight of 135 pounds per cubic foot, we estimate the additional settlement will be about 1 to 2 inches, for the range of QFM thickness revealed in the borings. Therefore, a total future settlement of about 5 to 6 inches should be expected.

We estimate about 95 percent of the additional settlement should occur in a period of about 20 years after the placement of the new fill. This kind of long term settlement could be problematic to site underground utilities as well as pavement and other surface improvements; frequent repairs of damage caused by differential settlement would have to be made. The District has indicated the expected settlement and the associated maintenance are unacceptable. Based on discussions with Messrs Wilson and Arends, we understand a maximum post-construction settlement of 1-inch would be tolerable.



4.1.2 Possible Methods of Accelerating Settlement

To reduce the potential for post construction differential settlement across the site, we have considered two methods of accelerating the consolidation of the QFM prior to construction of the parking lot; the methods are:

1. Preloading the compressible soils (QFM) by means of a surcharge fill; this surcharge would have to be of sufficient weight and left in place long enough to achieve the required consolidation;

2. Installing wick drains in the soil and loading the area using a surcharge fill; this method is used normally when the time available for preconsolidation is extremely limited.

Both methods would be compatible with the encapsulation in-place approach, because no cap or cover material would have to be removed from the site. However, wick drains would result in additional cost and might be difficult to install if buried rubble is present within some portions of the cap/cover. Furthermore, we estimate the objective of reducing the post construction settlement to about one inch could be achieved within the available time period of about 3 to 4 years, with the surcharge alone. Therefore, recommendations for only the first method are presented below.

4.1.3 Surcharge Fill Thickness and Duration

In order to reduce the potential post-construction differential settlement in the parking lot, we recommend that the consolidation of the QFM be accelerated by preloading the site with a surcharge having a thickness of at least 6 feet. We estimate a 6-foot high surcharge should induce about 5 inches of consolidation settlement within a period of 3 years. This is equivalent to approximately 95 percent consolidation due to the loads of the existing fill plus the proposed 1-1/2 to 2-1/2 feet of parking lot fill. Therefore, it is our opinion that preloading the site with a minimum of 6 feet of surcharge fill for at least 3 years is feasible to reduce the post-construction settlement to about one inch.



We recommend the actual magnitude and rate of settlement be monitored during the surcharge loading period to confirm that consolidation is attained. Specific details regarding settlement monitoring devices and their locations should be developed during the preparation of the plans and specifications.

4.2 SEISMIC STABILITY

4.2.1 Liquefaction

Soil liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary but essentially total loss of shear strength due to the reversing cyclic shear stresses caused by earthquake shaking. The native granular deposits which underlie the QFM at this site are primarily dense to very dense sandy to clayey gravel and are not prone to liquefaction. The existing cap/cover material comprises primarily moderately compacted clayey gravel fill; the underlying QFM is plastic clay. Neither of these fill deposits is considered to be susceptible to liquefaction. Therefore, it is our opinion there is a low potential for liquefaction induced lateral spreading or slumping of the slope bank of the Guadalupe River on the east side of the Storage Yard and that of the North Pond on the west side.

4.2.2 Slope Stability

To assess the risk of river bank and pond slope instability during earthquake ground motion, pseudo-static analyses were performed using Spencer's method of slices. Based upon the available topographic information, the existing river bank and pond slopes were assumed to be inclined at about 3 to 1 and 6 to 1 (horizontal to vertical), respectively.

In general, clayey soils and dense sand and gravel are not expected to experience high pore pressure build-up during earthquake shaking; thus, relatively little loss of strength is expected in the existing fills or underlying nature deposits. Since the soils which underlie the site consist of clays and dense clayey gravel to sandy gravel, we have used an analytical procedure suggested by H. Bolton Seed in "Consideration in the Earthquake-Resistant Design of Earth and Rockfill Dams" (1979).

Based on this procedure and the subsurface conditions revealed in our explorations, we estimate the pseudo-static factor of safety to be about 1.3 for a magnitude 6-1/2 earthquake and about 1.2 for a magnitude 8-1/4. Seed (1979) recommends a minimum factor of safety of 1.15 to keep embankment displacement within acceptable limits. On this basis, the risk of river bank and pond slope instability appears to be relatively low.

We also considered the stability of the river bank and pond slopes with 6 feet of surcharge fill in place during the three year preloading period. Pseudo-static factors of safety remain above 1.15 for magnitude 6-1/2 and 8-1/4 earthquakes provided the slopes of the surcharge fill are similar to the river bank and pond slopes.

4.3 PAVEMENT

The following pavement section is recommended for the proposed automobile parking lot:

Traffic Type	Asphalt Concrete (inch)	Class 2 Aggregate Base (inches)
Auto Parking Area	3	8

The recommended structural section is based on an assumed traffic index of 5 and a subgrade R-value of 20.

Material and construction within the structural section should conform to the applicable sections of the Caltrans Standard Specifications, latest edition, and the following earthwork recommendations in Section 4.4.

4.4 EARTHWORK

4.4.1 Subgrade Preparation

Before any fill is placed, the top one foot of subgrade soil should be compacted to a minimum relative compaction of 95 percent. The intent of recommending recompaction of the top 1 foot of the subgrade soils prior to any surcharge fill or pavement section

construction is to minimize the potential for future distress due to the possible presence of localized poorly compacted fill. We expect this can be achieved by compaction from the existing site surface.

4.4.2 Fill Placement and Compaction

The initial fill placed above the prepared subgrade then should be constructed in accordance with the requirements or Sections 19.5 and 19.6 of the Caltrans Standard Specifications. This will include the 1-1/2 to 2-1/2 feet of fill needed to raise the grade plus an allowance of about 1/2 foot for settlement. In general, this means fills should be placed in lifts not exceeding 8 inches in uncompacted thickness and should be compacted to a minimum relative compaction of 90 percent. The remainder of the surcharge fill also should be placed in lifts; we suggest this portion of the surcharge be compacted to a relative compaction of at least 85 percent.

When the upper 3 to 4 feet of surcharge fill is removed at the end of the settlement period and prior to placing any portion of the pavement section, the top 6 inches of the subgrade surface should be finish graded and compacted to a relative compaction of 95 percent. Aggregate base also should be compacted to a minimum relative compaction of 95 percent.

4.4.3 Surcharge Fill Material

Since the primary purpose of the surcharge is to provide additional load to preconsolidate the QFM, a wide variety of materials theoretically could be employed. However, because of practical considerations including handling, placement and maintenance of the fill, we recommend the surcharge consist of general engineered fill. The fill should be a soil or soil-rock mixture which is free from organic matter or other deleterious substances. It should contain no rocks or lumps over 6 inches in greatest dimension, and not more than 15 percent larger than 2-1/2 inches. In addition, we recommend the lower portion of the fill section required for the parking lot pavement subgrade, (i.e., the initial 2 to 3 feet of fill) should consist of a non-expansive select quality fill. In addition to the general criteria presented above, the select fill material should have a plasticity index not greater than 15 and a minimum R-value of 20.



5.0
LIMITATIONS

This document and the information contained herein have been prepared solely for the use of the Santa Clara Valley Water District. Our soil and groundwater investigations were limited to the property(s) described herein and our opinions regarding soil and groundwater conditions will be valid for those property(s) only. The subsurface investigation involved a limited number of sampling points from the cap material, the QFM layer, and soil beneath the QFM layer.

The conclusions and recommendations presented in this report are based on the assumption that the soil and groundwater conditions do not deviate appreciably from those disclosed in the exploratory borings. If any variations or undesirable conditions are encountered during construction, or if the proposed construction and site grades will differ from that planned at the present time, it is recommended that Woodward-Clyde Consultants be notified so that supplementary recommendations can be made, if necessary.

Prior to contract bidding, Woodward-Clyde Consultants should review those portions of the contract drawings and specifications which are affected by the recommendations made in this report; this is to confirm that the intent of the recommendations is incorporated into the contract documents. It also is recommended that Woodward-Clyde Consultants be retained during the construction phase to observe fill construction and monitor settlement during the preloading period.

The recommendations presented in this report were developed with the standard of care commonly used as state of the practice in the profession. No other warranties are included, either expressed or implied, as to the professional advice included in this report.



6.0
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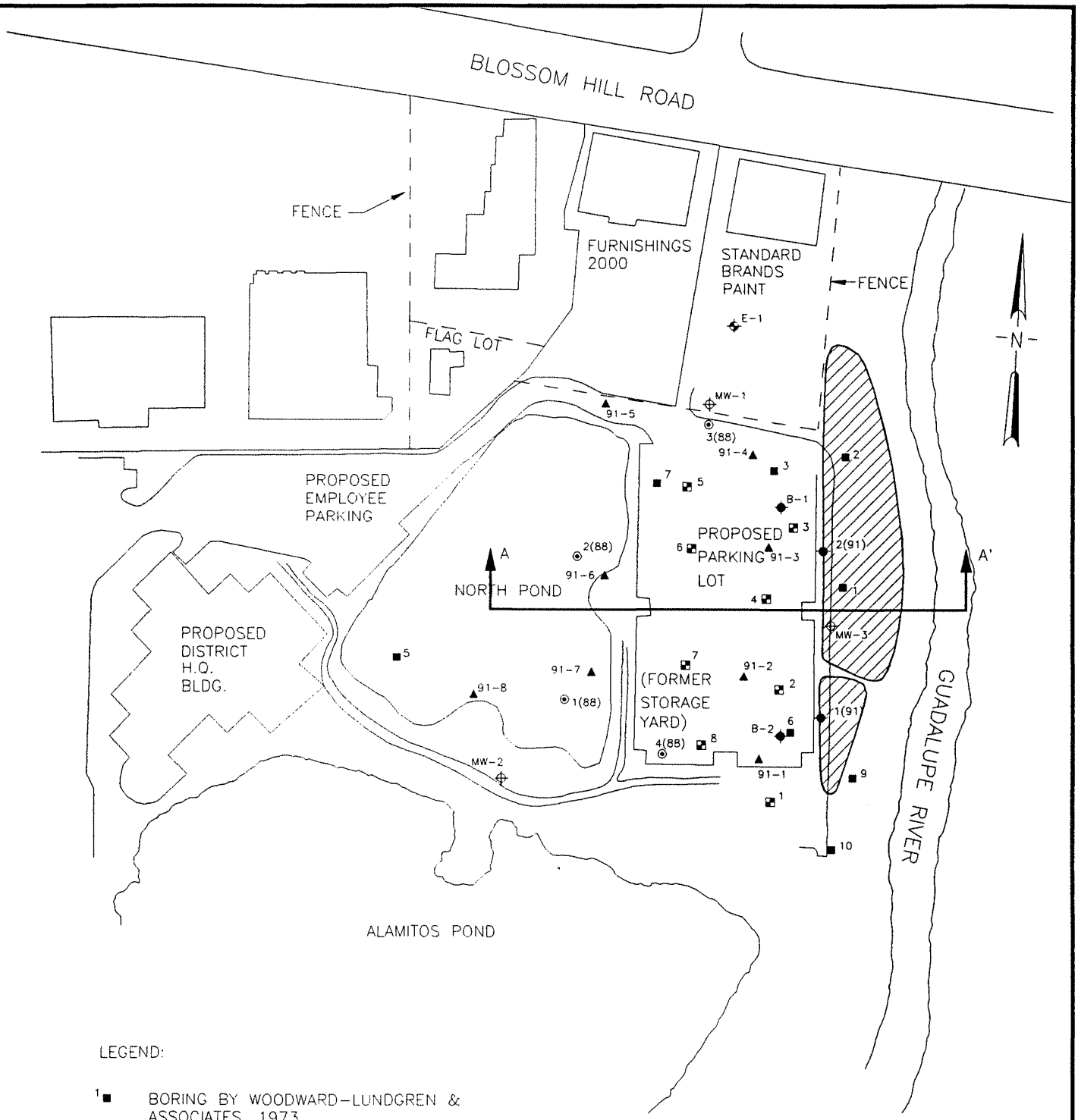
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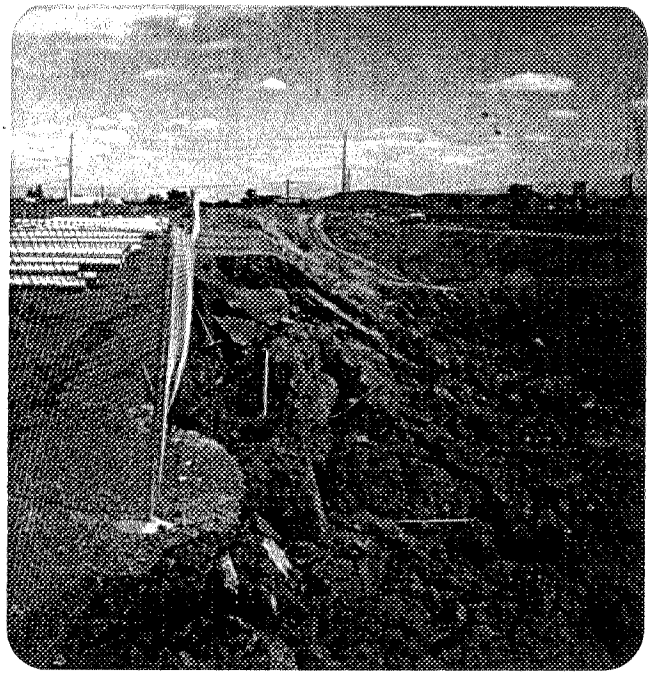
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- $^{1}\blacksquare$ BORING BY WOODWARD–LUNDGREN & ASSOCIATES, 1973.
- $^{1(88)}\odot$ BORING BY WOODWARD–CLYDE CONSULTANTS (WCC), 1988.
- $^{1}\blacksquare$ EXPLORATORY PITS BY WCC, 1988..
- $^{1(91)}\blacklozenge$ GEOTECHNICAL BORINGS BY WCC, 1991.
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- $^{91-8}\blacktriangle$ ENVIRONMENTAL SOIL BORING BY WCC, 1991.
- $^{MW-3}\oplus$ GROUNDWATER MONITORING WELL BY WCC, 1992.
- $^{B-2}\blacklozenge$ GEOTECHNICAL SOIL BORING BY WCC, 1992.
- $^{E-1}\diamond$ ENVIRONMENTAL SOIL BORING BY WCC, 1992.

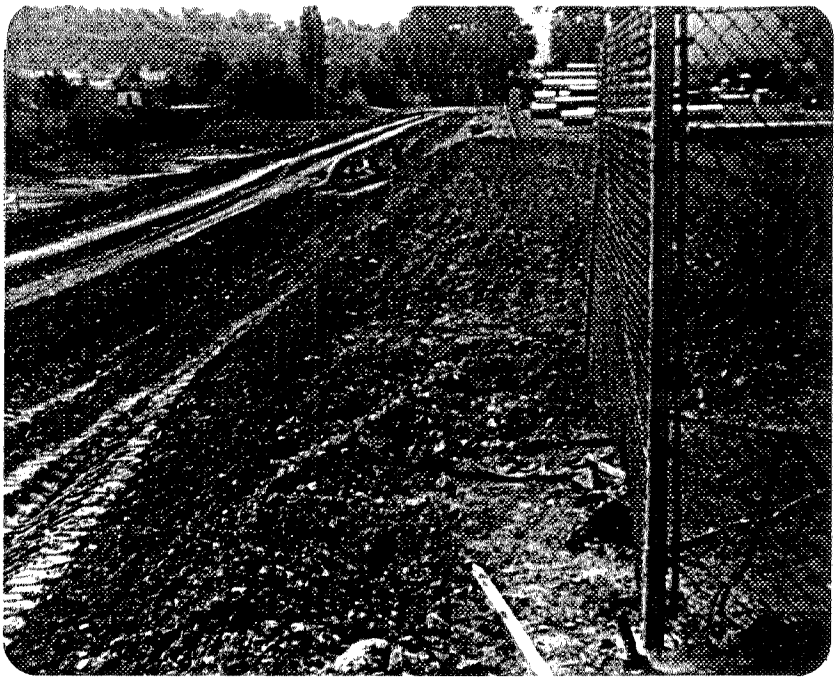
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APPROX. SCALE IN FEET

Project No. 91C-0588R	PROPOSED PARKING LOT SANTA CLARA VALLEY WATER DISTRICT San Jose, California	SITE AND BORING LOCATION PLAN
05/14/93		Figure 1
WOODWARD–CLYDE CONSULTANTS		

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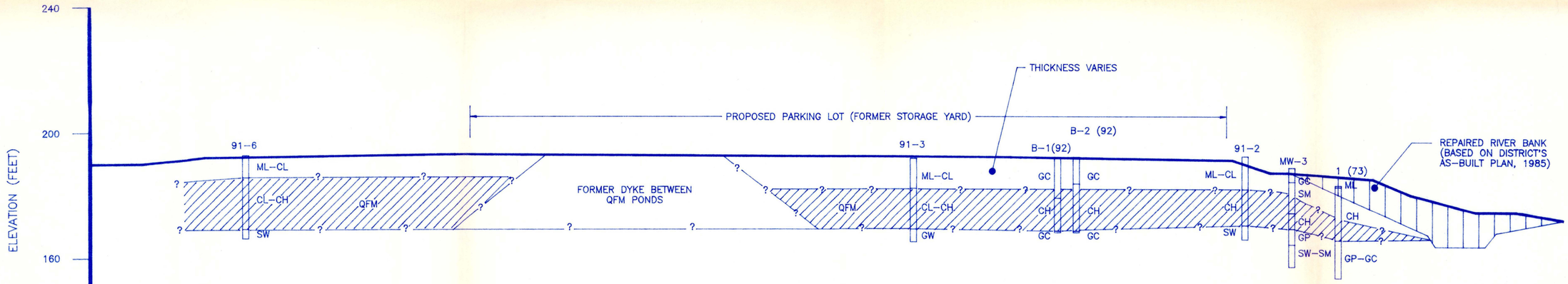
GUADALUPE RIVER BANK SLIDE AT FORMER STORAGE YARD, AUGUST 4, 1976



REPAIRED GUADALUPE RIVER BANK AT FORMER STORAGE YARD, AUGUST 23, 1976

Photos courtesy of Santa Clara Valley Water District

Project No. 91C-0588R	PROPOSED PARKING LOT SANTA CLARA VALLEY WATER DISTRICT San Jose, California 95113	CONSTRUCTION PHOTOS GUADALUPE RIVER IMPROVEMENTS	Figure 2
04/08/93			
Woodward-Clyde Consultants			



NOTES:

1. See Figure 1 for section and boring locations.
2. The Idealized Cross Section has been constructed by direct interpolation between borings drilled at varying spacings and projected to the section line. The lines corresponding to the various layer boundaries at each boring location are for schematic illustration purposes only and should not be construed to represent the actual conditions in the field. Gradational changes shown within the various layers should also be considered approximate.
3. For detailed descriptions of materials encountered in borings, see Appendices A and B.
4. The approximate ground surface has been based upon topographic information provided by the Santa Clara Valley Water District.

0 20 40 80

SCALE IN FEET

Project No. 91C-0588-R	PROPOSED PARKING LOT SANTA CLARA VALLEY WATER DISTRICT San Jose, California	IDEALIZED CROSS SECTION A-A' LOOKING NORTH
05/20/93		Figure 3
WOODWARD-CLYDE CONSULTANTS		

APPENDIX A

APPENDIX A
FIELD INVESTIGATION AND LABORATORY TESTING

Drilling and Soil Sampling

Drilling was performed using 8 to 10-inch diameter, continuous flight, hollow stem augers. The augers were steam cleaned prior to drilling and before each use to reduce the possibility of down hole or cross-hole contamination.

Soil sampling was performed using 2-1/2 inch outside diameter California modified split-spoon sampler internally lined with clean, replaceable, 4 to 6-inch brass or stainless steel cylinders. In each boring, soil samples were collected at approximately 2 feet below the surface and nearly continuously from a depth of approximately 5 feet to about 2 feet below interface level of the cap and cover fill and the QFM. Samples were collected by advancing the augers to a point immediately above the sampling depth and then driving the sampler into the soil through the hollow center of the auger. The sampler was driven 18 inches with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows to drive the sampler each 6-inch increment was counted and recorded to evaluate the relative consistency or density of the soil. A legend of the boring operation and well construction are presented on Figure A-1 and A-2, respectively.

Soil encountered during drilling was logged and classified according to the Unified Soil Classification System. A summary of the soil classification system is presented on Figure A-3. Descriptions of soil encountered in the borings and wells are presented on the Logs of Borings, Figures A-4 through A-9.

Laboratory Tests

Samples were sealed to preserve moisture for further review and testing in our laboratory. Laboratory tests performed for selected samples include water content, dry density and unconfined compressive strength. Results of these tests, together with the resistance to penetration of the sampler, are shown on the corresponding sample locations on the Logs of Borings, Figures A-4 through A-9.

Two (2) consolidation tests also were performed on selected Shelby tube samples of clay soils to assist in settlement analysis. The results of these tests are presented graphically on Figures A-10 and A-11.

Atterberg limits were performed on selected samples of clay soils to estimate its plasticity characteristics. The results are presented graphically on Figures A-12.

Two (2) R-value tests also were performed for near surface bulk samples to assist in the design of pavement sections. Figures A-13 and A-14 present the results of these tests.



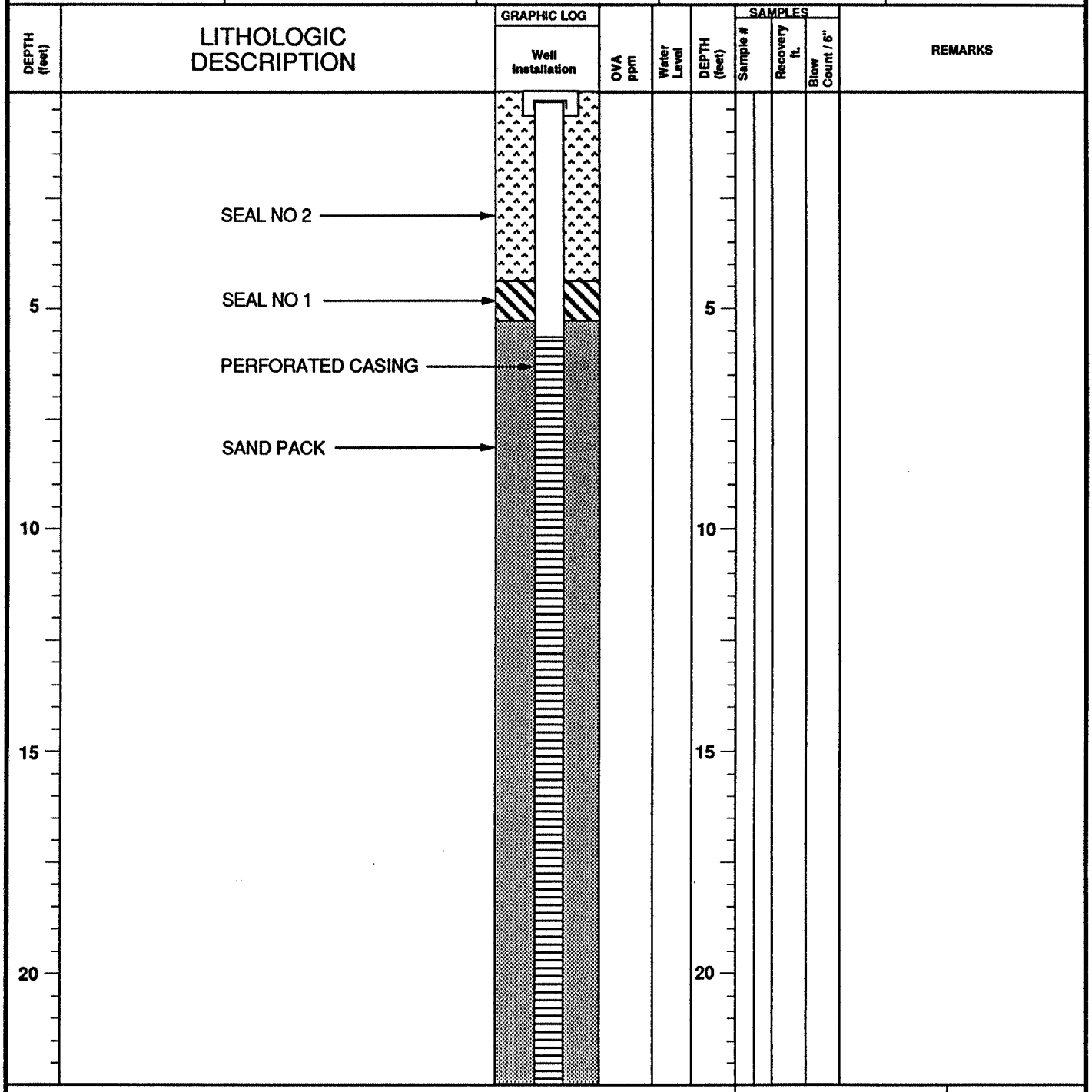
PARKING LOT EXPANSION, S. C. V. W. D.

BORING LOCATION					GROUND SURFACE ELEVATION		
DRILLING AGENCY	DRILLER				DATE STARTED DATE FINISHED		
DRILLING EQUIPMENT					COMPLETION DEPTH	HAMMER	
DRILLING METHOD	DRILL BIT				NO. OF SAMPLES	PUSHED	DRIVEN
SIZE AND TYPE OF CASING		FROM	TO	Ft.	WATER DEPTH	FIRST	COMPL. / 24 HRS.
TYPE OF PERFORATION		FROM	TO	Ft.	LOGGED BY:		LOG OF BORING NO.
SIZE AND TYPE OF PACK		FROM	TO	Ft.			LEGEND SHEET
TYPE OF SEAL	No. 1	FROM	TO	Ft.	CHECKED BY:		
	No. 2	FROM	TO	Ft.			

DEPTH (feet)	LITHOLOGIC DESCRIPTION	OVA/ HNu ppm	Water Level	DEPTH (feet)	SAMPLES: Sample #	SAMPLES: Recovery ft.	SAMPLES: Blow Count / 6"	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONF. COMPRESS. STRENGTH (psf)
5	2-inch I.D. Modified California Sampler (2-1/2 inch O.D.			5						
	2-inch O.D. Standard Split-Spoon Sampler									
10	Blowcount per 6 inch penetration with falling 30 inches; Blows per foot is equal to the sum of the lower two numbers; eg. 15+18=33			10			25 15 18			
15	Water Level Measured: at time of drilling		ATD	15						
	Monitoring Equipment:									
	OVA-Organic Vapor Analyzer (Flame ionization detector [FID])									
20	HNu - Photoionization detector (PID)			20						

PARKING LOT EXPANSION, S. C. V. W. D.

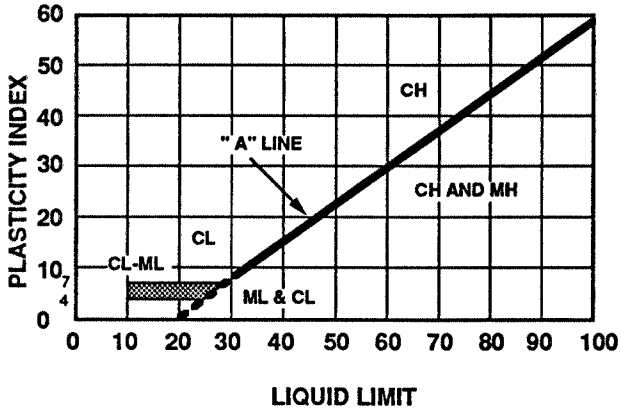
BORING LOCATION		ELEVATION OF TOP OF CASING	
DRILLING AGENCY	DRILLER	DATE STARTED DATE FINISHED	
DRILLING EQUIPMENT		COMPLETION DEPTH	HAMMER
DRILLING METHOD	DRILL BIT 10 inch	NO. OF SAMPLES PUSHED	DRIVEN
SIZE AND TYPE OF CASING	FROM TO Ft.	WATER DEPTH FIRST	COMPL. 24 HRS.
TYPE OF PERFORATION	FROM TO Ft.	LOGGED BY:	LOG OF WELL NO.
SIZE AND TYPE OF PACK	FROM TO Ft.		LEGEND SHEET
TYPE OF SEAL — No. 1	FROM TO Ft.	CHECKED BY:	
TYPE OF SEAL — No. 2	FROM TO Ft.		



SAMPLE CLASSIFICATION CHART

UNIFIED SOIL CLASSIFICATION SCHEME			
MAJOR DIVISIONS		**SYMBOLS**	**TYPICAL NAMES**
COARSE GAINED SOIL (More than 1/2 of soil >no. 200 sieve size)	GRAVELS (More than 1/2 of coarse fraction > no. 4 sieve size)	GW	Well-graded gravels and gravel and mixtures, little or no fines
		GP	Poorly-graded gravel or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	SAND (More than 1/2 of coarse fraction < no. 4 sieve size)	SW	Well-graded sands or gravelly sands, little or no fines
		SP	Poorly-graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE GAINED SOIL (More than 1/2 of soil <no. 200 sieve size)	SILTS & CLAYS Liquid Limit < 50	ML	Inorganic sites and very fine sands, rock flour, silty or clayey, fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays. sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS Liquid Limit > 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils

PLASTICITY CHART



GRAIN SIZE CLASSIFICATION		
CLASSIFICATION	**RANGE OF GRAIN SIZES**	
	U.S. Standard Sieve Size	**Grain Size in Millimeters**
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL coarse (c) fine (f)	3" to No. 4 3" to 3/4" 3/4" to No. 4	76.2 to 4.76 76.2 to 19.1 19.1 to 4.76
SAND coarse (c) medium (m) fine (f)	No. 4 to No. 200 No. 4 to No. 10 No. 10 to No. 40 No. 40 to No. 200	4.76 to 0.074 4.76 to 2.00 2.00 to 0.420 0.420 to 0.074
SILT & CLAY	Below No. 200	Below 0.074

SOIL CONSISTENCY/RELATIVE DENSITY				
SILT, SAND AND GRAVEL	BLOWS/FT	SILT OR CLAY	UNCONFINED COMPRESSIVE STRENGTH (psf)	THUMB PENETRATION
Very loose	<4	Very Soft	< 500	Very easily - inches
Loose	5-10	Soft	500 - 1000	Easily - inches
Medium Dense	11-30	Medium (firm)	1000 - 2000	Moderate effort - inches
Dense	31-50	Stiff	2000 - 4000	Indented easily
Very Dense	>50	Very Stiff	4000 - 8000	Indented by nail
		Hard	> 8000	Difficult by nail

CLASSIFICATION MODIFIERS	
TRACE	0 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
AND	35 - 50%
± MODIFIERS	

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FIGURE: A-3

PARKING LOT EXPANSION, S. C. V. W. D.

BORING LOCATION Northern end of storage yard area		**GROUND SURFACE ELEVATION** NOT SURVEYED	
DRILLING AGENCY West Hazmat Drilling Corp., Hayward, CA	**DRILLER** T. Wright	**DATE STARTED** 4-10-92 **DATE FINISHED** 4-10-92	
DRILLING EQUIPMENT CME 55		**COMPLETION DEPTH** 24feet	**HAMMER** 140 lb
DRILLING METHOD Hollow Stem Auger	**DRILL BIT** 8 inch	**NO. OF SAMPLES** **PUSHED** 2	**DRIVEN** 10
SIZE AND TYPE OF CASING NA	FROM TO Ft.	**WATER DEPTH** **FIRST** 23.8 feet	**COMPL.** NA **24 HRS.** NA
TYPE OF PERFORATION NA	FROM TO Ft.	**LOGGED BY:** W. Dittman	**LOG OF BORING NO.** **B-1**
SIZE AND TYPE OF PACK NA	FROM TO Ft.		
TYPE OF SEAL No. 1 Bentonite Pellets	FROM NA TO NA Ft.	**CHECKED BY:** C. Conway R. G. 4530, S. Huang G. E. 2150	
No. 2 Neat Cement (5% Bentonite)	FROM 0 TO 24 Ft.		

DEPTH (feet)	LITHOLOGIC DESCRIPTION	OVA ppm	Water Level	DEPTH (feet)	SAMPLES Sample #	Recovery ft.	Blow Count / 6"	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONF. COMPRESS. STRENGTH (psf)
	CLAYEY GRAVEL (GC) FILL Moderately compacted, dry, dark grayish brown (10YR 4/2), trace sand and 3-4 inch cobbles	0.2			1	1	20 25 32			
5	becoming silty	6.2		5	2	1	25 15 18			
	contains asphaltic material	NA			3	1	23 23 20	8		
		NA			4	0.5	18 18 7	7		
10	moist	6.1		10	5	0.5	18 25 50 3"			
	poorly compacted	NA			6	0.3	7 7 4			
	CLAY (CH) FILL "QUARRY FINES" Soft, wet, olive gray (5Y 5/2)	0.8			7	1	1 1 2	58	63	480
15	LL = 57 PI = 28	NA		15	8	2.3	Push	49	66	810
	becoming yellowish brown (10YR 4/4), occasional silty sand layers 1 to 2 inches thick	0.2			9	1.5	1 2 1	62	63	440
	LL = 91 PI = 57	NA			10	2.3	Push	70	58	1020
20		1		20	11	1.5	1 2 2	75	56	260

PARKING LOT EXPANSION, S. C. V. W. D.

LOG OF BORING NO. B-1 (con't)

DEPTH (feet)	LITHOLOGIC DESCRIPTION	OVA ppm	Water Level	DEPTH (feet)	SAMPLES: Sample #	SAMPLES: Recovery ft.	SAMPLES: Blow Count / 6"	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONF. COMPRESS. STRENGTH (psf)
	CLAY (CH) FIL "QUARY FINES" (continued) (FILL)				12	0.3	15 50/3"			
			ATD							
	CLAYEY GRAVEL (GC) Very dense, wet, dark gray (5Y 4/1), with little fine sand, angular siltstones and sandstones	NA								
	BOTTOM OF BORING AT 24 FEET									
25				25						
30				30						
35				35						
40				40						
45				45						
50				50						

PARKING LOT EXPANSION, S. C. V. W. D.

BORING LOCATION Southern end of storage yard area		**GROUND SURFACE ELEVATION** NOT SURVEYED	
DRILLING AGENCY West Hazmat Drilling Corp., Hayward, CA	**DRILLER** T. Wright	**DATE STARTED** 4-10-92 **DATE FINISHED** 4-10-92	
DRILLING EQUIPMENT CME 55		**COMPLETION DEPTH** 24 feet	**HAMMER** 140 lb
DRILLING METHOD Hollow Stem Auger	**DRILL BIT** 8 inch	**NO. OF SAMPLES** PUSHED 2	DRIVEN 8
SIZE AND TYPE OF CASING NA	FROM TO Ft.	**WATER DEPTH** FIRST 21.9 feet	COMPL. NA / 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO Ft.	**LOGGED BY:** W. Dittman	**LOG OF BORING NO.** B-2
SIZE AND TYPE OF PACK NA	FROM TO Ft.		
TYPE OF SEAL No. 1 Bentonite Pellets	FROM NA TO NA Ft.	**CHECKED BY:** C. Conway R. G. 4530, S. Huang G.E. 2150	
No. 2 Neat Cement (5% Bentonite)	FROM 0 TO 24 Ft.		

DEPTH (feet)	LITHOLOGIC DESCRIPTION	OVA ppm	Water Level	DEPTH (feet)	SAMPLES Sample #	Recovery ft.	Blow Count / 6"	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONF. COMPRESS. STRENGTH (psf)
	CLAYEY GRAVEL (GC) FILL Moderately compacted, dry, pale brown (10YR 6/3), with trace sand and 3-4 inch cobbles	0.2			1	1	20 28 32			
5	contains asphaltic material	0.4		5	2	0.5	30 15 25	16		
	damp	NA			3	0.5	20 20 20			
	CLAY (CH) FILL "QUARRY FINES" Soft, wet, dark grayish brown (10YR 4/2)	NA			4	0.5	2 5 8	56	63	530
10		1		10	5	1.5	2 3 3	74	54	
	LL = 58 PI = 29	NA			6	2.3	Push	58	63	650
15	very soft, gray (5Y 5/1), black streaks	NA		15	7	1.5	1 1 1	80	52	440
	LL = 86 PI = 52									
	soft	NA			8	2.3	Push	65	61	810
20	grayish brown (10YR 4/2), soft	0.8	ATD	20	9	1.5	1 1 1	63	62	700

PARKING LOT EXPANSION, S. C. V. W. D.

LOG OF BORING NO. B-2 (con't)

DEPTH (feet)	LITHOLOGIC DESCRIPTION	OVA ppm	Water Level	DEPTH (feet)	SAMPLES Sample #	SAMPLES Recovery ft.	SAMPLES Blow Count / 6"	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONF. COMPRESS. STRENGTH (psf)
	CLAY (CH) FILL "QUARRY FINES" (continued) (FILL)	1.4			10	0.5	15 18 10			
25	CLAYEY SANDY GRAVEL (GC) Medium dense, wet, yellowish brown (10YR 5/4), gravel is fine, angular to well rounded siltstones and sandstones			25						
	BOTTOM OF BORING AT 24 FEET									
30				30						
35				35						
40				40						
45				45						
50				50						

PARKING LOT EXPANSION, S. C. V. W. D.

BORING LOCATION South central area of Standard Brands Paint property		**GROUND SURFACE ELEVATION** NOT SURVEYED	
DRILLING AGENCY West Hazmat Drilling Corp., Hayward, CA	**DRILLER** T. Wright	**DATE STARTED** 4-6-92 **DATE FINISHED** 4-6-92	
DRILLING EQUIPMENT CME 55		**COMPLETION DEPTH** 31 feet	**HAMMER** 140 lb
DRILLING METHOD Hollow Stem Auger	**DRILL BIT** 8 inch	**NO. OF SAMPLES** PUSHED 0	**DRIVEN** 7
SIZE AND TYPE OF CASING NA	FROM TO Ft.	**WATER DEPTH** FIRST 20.5 feet	**COMPL.** NA **24 HRS.** NA
TYPE OF PERFORATION NA	FROM TO Ft.	**LOGGED BY:** W. Dittman	**LOG OF BORING NO.** E-1
SIZE AND TYPE OF PACK NA	FROM TO Ft.		
TYPE OF SEAL No. 1 Bentonite Pellets	FROM NA TO NA Ft.	**CHECKED BY:** Charles Conway, R.G. 4530	
No. 2 Neat Cement (5% Bentonite)	FROM 0.3 TO 25 Ft.		

DEPTH (feet)	LITHOLOGIC DESCRIPTION	HNu ppm	Water Level	DEPTH (feet)	SAMPLES Sample #	Recovery ft.	Blow Count / 6"	REMARKS
	Asphalt Concrete 2 inches thick							
	CLAYEY SILT (ML) FILL Moderately compacted, damp, random fill, with little gravel to 3/8 inches, trace fine sand	1			1	1	25 23 27	
5	grades to some gravel to 2 inches	1		5	2	1	21 25 30	
10		1		10	3	1	9 15 7	
	SILTY SAND (SM) FILL Poorly compacted, damp, brown (10YR 5/3), poorly graded, sand is fine							
15	CLAY (CH) FILL "QUARRY FINES"/ FILL MIXTURE Poorly compacted, moist to wet, very dark gray (10YR 3/1), low plasticity, sand is fine, with trace small wood fragments	1		15	4	1.5	2 4 8	
	(FILL)							
20	CLAYEY GRAVEL (GC) Dense, wet, dark yellowish brown (10YR 4/4), with gravel to 1-1/2 inch, little sand, subangular to subrounded cherts, siltstones and sandstones	1		20	5	1	12 23 20	

PARKING LOT EXPANSION, S. C. V. W. D.

LOG OF BORING NO. E-1 (con't)

DEPTH (feet)	LITHOLOGIC DESCRIPTION	HNu ppm	Water Level	DEPTH (feet)	SAMPLES Sample #	SAMPLES Recovery ft.	SAMPLES Blow Count / 6"	REMARKS
25	CLAYEY GRAVEL (GC) (Continued)		ATD	25				
	very dense	1			6	0.5	20 50/5.5"	
30		1		30	7	1	25 50/6"	
	BOTTOM OF BORING AT 31FEET							The borehole caved to 25 feet prior to placement of cement
35				35				
40				40				
45				45				
50				50				

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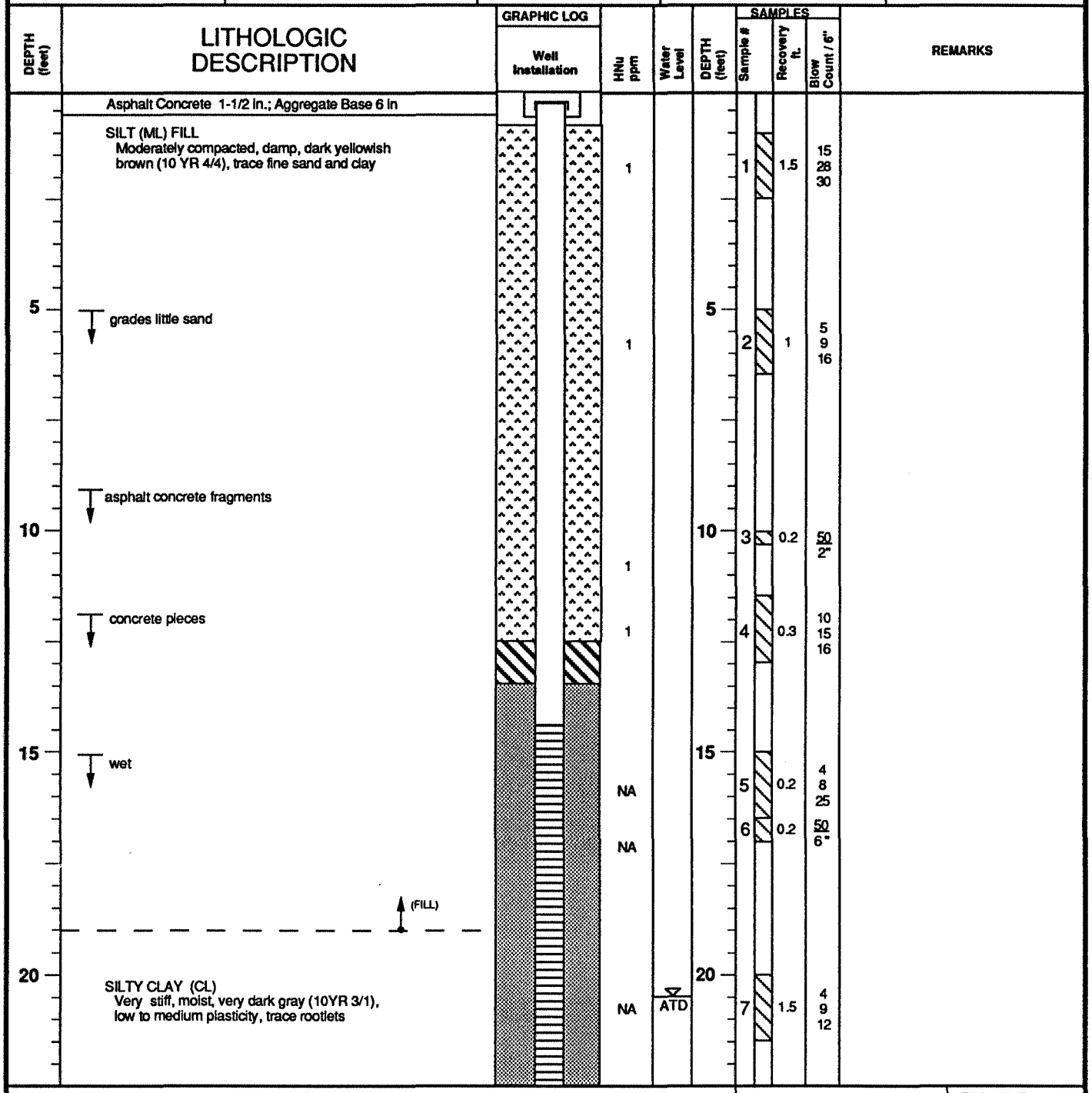
Project No. 91C-0588-S

FIGURE: A-6

Sheet 2 of 2

PARKING LOT EXPANSION, S. C. V. W. D.

BORING LOCATION South end of Standard Brands Paint property		**TOP OF CASING ELEVATION** 192.10 feet MSL	
DRILLING AGENCY West Hazmat Drilling Corp., Hayward, CA	**DRILLER** T. Wright	**DATE STARTED** 4-6-92 **DATE FINISHED** 4-6-92	
DRILLING EQUIPMENT CME 55		**COMPLETION DEPTH** 31-1/2 feet	**HAMMER** 140 lb
DRILLING METHOD Hollow Stem Auger	**DRILL BIT** 10 inch	**NO. OF SAMPLES** PUSHED 0	DRIVEN 9
SIZE AND TYPE OF CASING 4 inch PVC — FROM 0.5 TO 14.5 Ft.		**WATER DEPTH** FIRST 20.5 feet	COMPL. 23.1 feet / 24 HRS. 23.6 feet
TYPE OF PERFORATION 0.010 inch slotted — FROM 14.5 TO 29.5 Ft.		**LOGGED BY:** W. Dittman	**LOG OF WELL NO.**
SIZE AND TYPE OF PACK #2/12 Lonestar Sand — FROM 13.5 TO 29.5 Ft.			**MW-1**
TYPE OF SEAL No. 1 Bentonite Pellets — FROM 12.5 TO 13.5 Ft.		**CHECKED BY:** C. Conway, R.G. 4530	
No. 2 Neat Cement (5% Bentonite) — FROM 1 TO 12.5 Ft.			



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Project No. 91C-0588-S

FIGURE: A-7

Sheet 1 of 2

PARKING LOT EXPANSION, S. C. V. W. D.

LOG OF WELL NO. MW-1 (con't)

DEPTH (feet)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG: Well Installation	HNu ppm	Water Level	DEPTH (feet)	SAMPLES: Sample #	SAMPLES: Recovery ft.	SAMPLES: Blow Count / 6"	REMARKS
	SILTY CLAY (CL) (Continued)								Water level at 12:40 PM on 4-7-92 .
25	GRAVELLY SAND (SW) Medium dense, wet, very dark grayish brown (10YR 3/2), angular to subrounded siltstone and sandstone (grading more gravel in tip of sampler)		1		25	8	1	10 10 12	
30	CLAYEY, SANDY GRAVEL (GC) Dense, wet, brown (10YR 5/3), well graded, gravel to 1/2 inch, angular to subrounded siltstones and sandstones	CAVED	1		30	9	1	5 19 30	
	BOTTOM OF BORING AT 31-1/2 FEET								
35					35				
40					40				
45					45				
50					50				

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Project No. 91C-0588-S

FIGURE: A-7

Sheet 2 of 2

PARKING LOT EXPANSION, S. C. V. W. D.

BORING LOCATION Southwest of storage yard		**TOP OF CASING ELEVATION** 192.37 feet MSL	
DRILLING AGENCY West Hazmat Drilling Corp., Hayward, CA	**DRILLER** T. Wright	**DATE STARTED** 4-7-92 **DATE FINISHED** 4-9-92	
DRILLING EQUIPMENT CME 55		**COMPLETION DEPTH** 32 feet	**HAMMER** 140 lb
DRILLING METHOD Hollow Stem Auger	**DRILL BIT** 10 inch	**NO. OF SAMPLES** **PUSHED** 0	**DRIVEN** 7
SIZE AND TYPE OF CASING 4 inch PVC	FROM 0.5 TO 15.5 Ft.	**WATER DEPTH** **FIRST** 21.2 feet	**COMPL.** 20.5 feet **24 HRS.** 20.5 feet
TYPE OF PERFORATION 0.010 inch slotted	FROM 15.5 TO 30.5 Ft.	**LOGGED BY:** W. Dittman	**LOG OF WELL NO.** **MW-2**
SIZE AND TYPE OF PACK #2/12 Lonestar Sand	FROM 14.5 TO 31 Ft.		
TYPE OF SEAL No. 1 Bentonite Pellets	FROM 13.5 TO 14.5 Ft.	**CHECKED BY:** C. Conway, R. G. 4530	
No. 2 Neat Cement (5% Bentonite)	FROM 1 TO 13.5 Ft.		

DEPTH (feet)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG Well Installation	OVA ppm	Water Level	DEPTH (feet)	SAMPLES Sample #	Recovery ft.	Blow Count / 6"	REMARKS
0	SILTY GRAVEL (GM) FILL Moderately compacted, dry, yellowish brown (10YR 5/4), skip graded, with little sand		1		0	1	1	20 30 29	
5	FILL		1		5	2	1	17 20 20	
10	CLAYEY GRAVEL (GC) Very dense, damp, dark yellowish brown (10YR 4/4), with some sand, gravel to 1/2 inch, angular to subrounded chert, siltstone and sandstone		1		10	3	1.5	20 24 50 5"	
15	medium dense, wet		0.4		15	4	1.5	7 13 13	
20	CLAYEY SAND (SC) Very dense, wet, yellowish brown (10YR 5/6), with little gravel, subangular to subrounded siltstone and sandstone		0.4	ATD	20	5	1	35 50 6"	Water level at 14:24, on 4-10-92

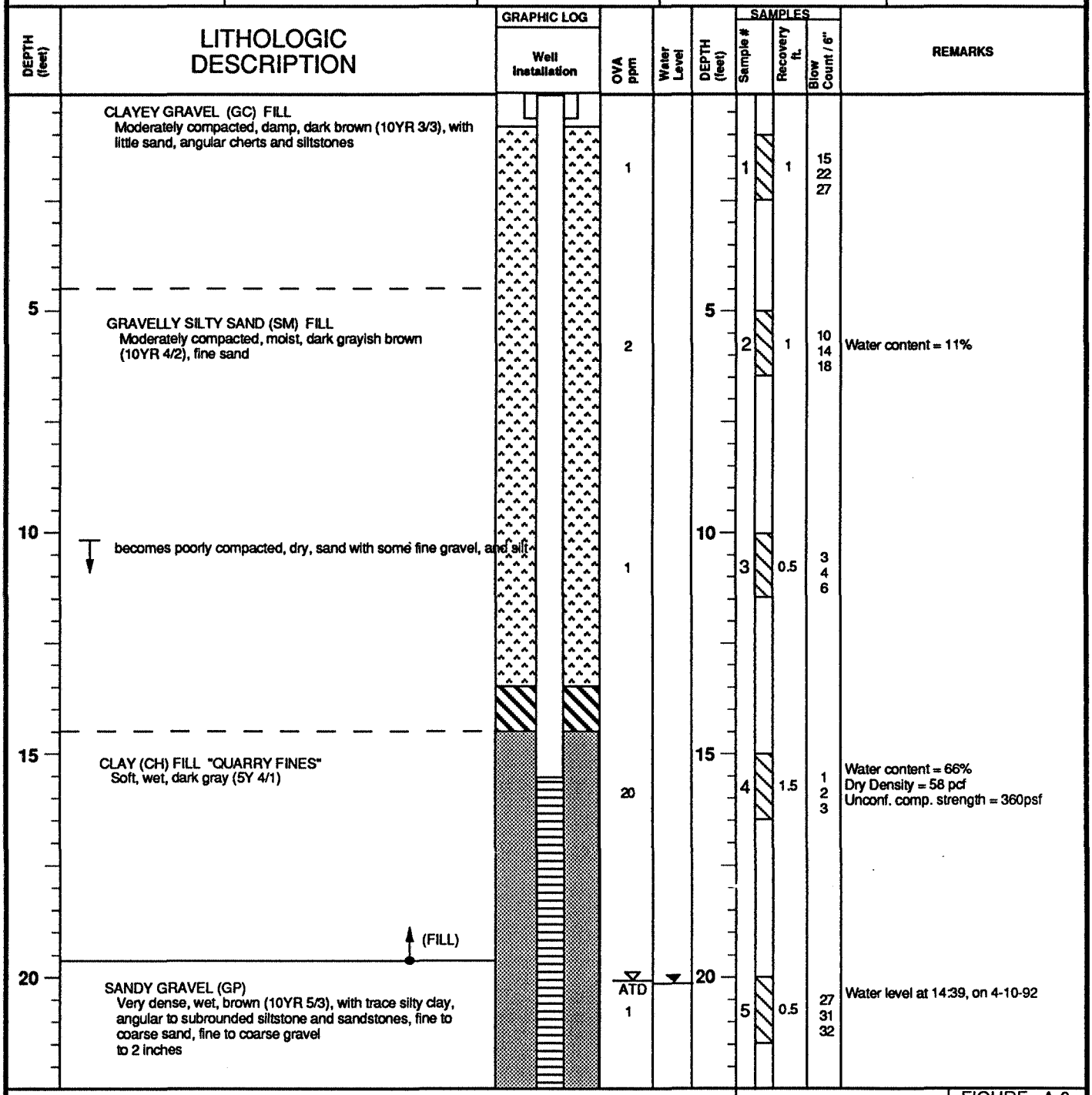
PARKING LOT EXPANSION, S. C. V. W. D.

LOG OF WELL NO. MW-2 (con't)

DEPTH (feet)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG / Well Installation	OVA ppm	Water Level	DEPTH (feet)	SAMPLES: Sample #	SAMPLES: Recovery ft.	SAMPLES: Blow Count / 6"	REMARKS
	CLAYEY SAND (SC) (Continued)								
25	SAND (SW) Very dense, wet, varicolored, well graded with little gravel to 3/8 inches, trace silt, subrounded to well-rounded siltstone and sandstone		NA		25	6	0.3	5 50/3"	
30	dense		0.2		30	7	1	9 22 27	
	BOTTOM OF BORING AT 32 FEET	* See note below							
35	* MW-2 was initially drilled to 32 feet but borehole caved in. Well casings were retrieved, and borehole was sealed with grout. Well was then installed approximately 10 feet southeast of the original location. Bottom of well was at 31 feet.				35				
40					40				
45					45				
50					50				

PARKING LOT EXPANSION, S. C. V. W. D.

BORING LOCATION East of and adjacent to the storage yard		**TOP OF CASING ELEVATION** 188.25 feet MSL	
DRILLING AGENCY West Hazmat Drilling Corp., Hayward, CA	**DRILLER** T. Wright	**DATE STARTED** 4-7-92 **DATE FINISHED** 4-9-92	
DRILLING EQUIPMENT CME 55		**COMPLETION DEPTH** 31-1/2 feet	**HAMMER** 140 lb
DRILLING METHOD Hollow Stem Auger	**DRILL BIT** 10 inch	**NO. OF SAMPLES** PUSHED 0	DRIVEN 7
SIZE AND TYPE OF CASING 4 inch PVC	FROM 0.5 TO 15.5 Ft.	**WATER DEPTH** FIRST 20.1 feet	COMPL. 20.2 feet / 24 HRS. 20.2 feet
TYPE OF PERFORATION 0.010 inch slotted	FROM 15.5 TO 30.5 Ft.	**LOGGED BY:** W. Dittman	**LOG OF WELL NO.** MW-3
SIZE AND TYPE OF PACK #2/12 Lonestar Sand	FROM 14.5 TO 29 Ft.		
TYPE OF SEAL No. 1 Bentonite Pellets	FROM 13.5 TO 14.5 Ft.	**CHECKED BY:** C. Conway, R. G. 4530	
No. 2 Neat Cement (5% Bentonite)	FROM 1 TO 13.5 Ft.		



Woodward-Clyde Consultants

Project No. 91C-0588-S

FIGURE: A-9

Sheet 1 of 2

PARKING LOT EXPANSION, S. C. V. W. D.

LOG OF WELL NO. MW-3 (con't)

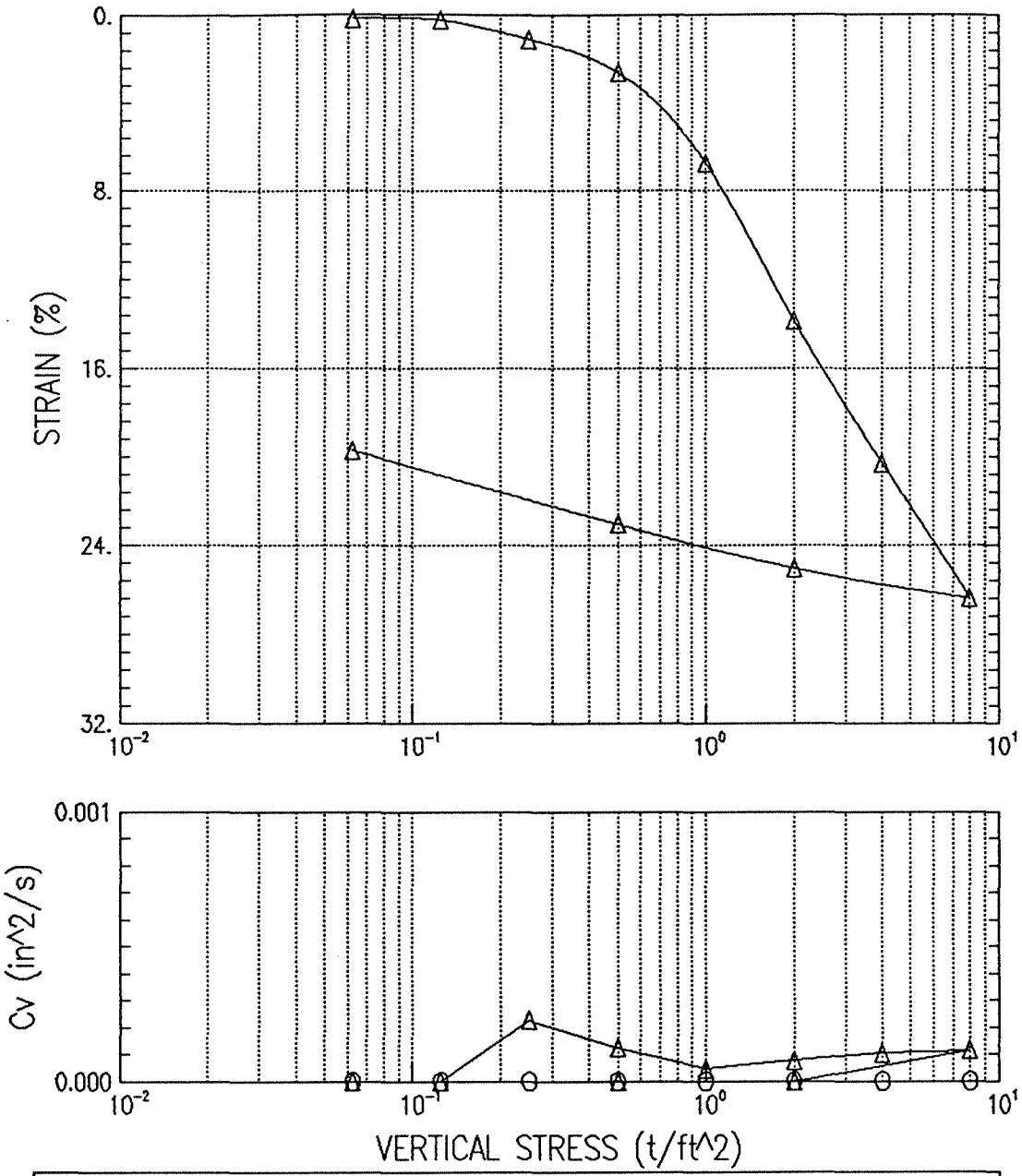
DEPTH (feet)	LITHOLOGIC DESCRIPTION	GRAPHIC LOG / Well Installation	OVA ppm	Water Level	DEPTH (feet)	SAMPLES: Sample #	SAMPLES: Recovery ft.	SAMPLES: Blow Count / 6"	REMARKS
25	SANDY GRAVEL (GP) (Continued)				25				
	SILTY SAND (SW- SM) Very dense, wet, brown (10YR 5/3), well graded, with little fine gravel, angular to subrounded siltstone and sandstone		1			6	0.5	25 50/6"	
30	dense	Hole caved - flowing sand	0.4		30	7	0.5	4 17 18	
	BOTTOM OF BORING AT 31-1/2 FEET								
35					35				
40					40				
45					45				
50					50				

Woodward-Clyde Consultants

Project No. 91C-0588-S

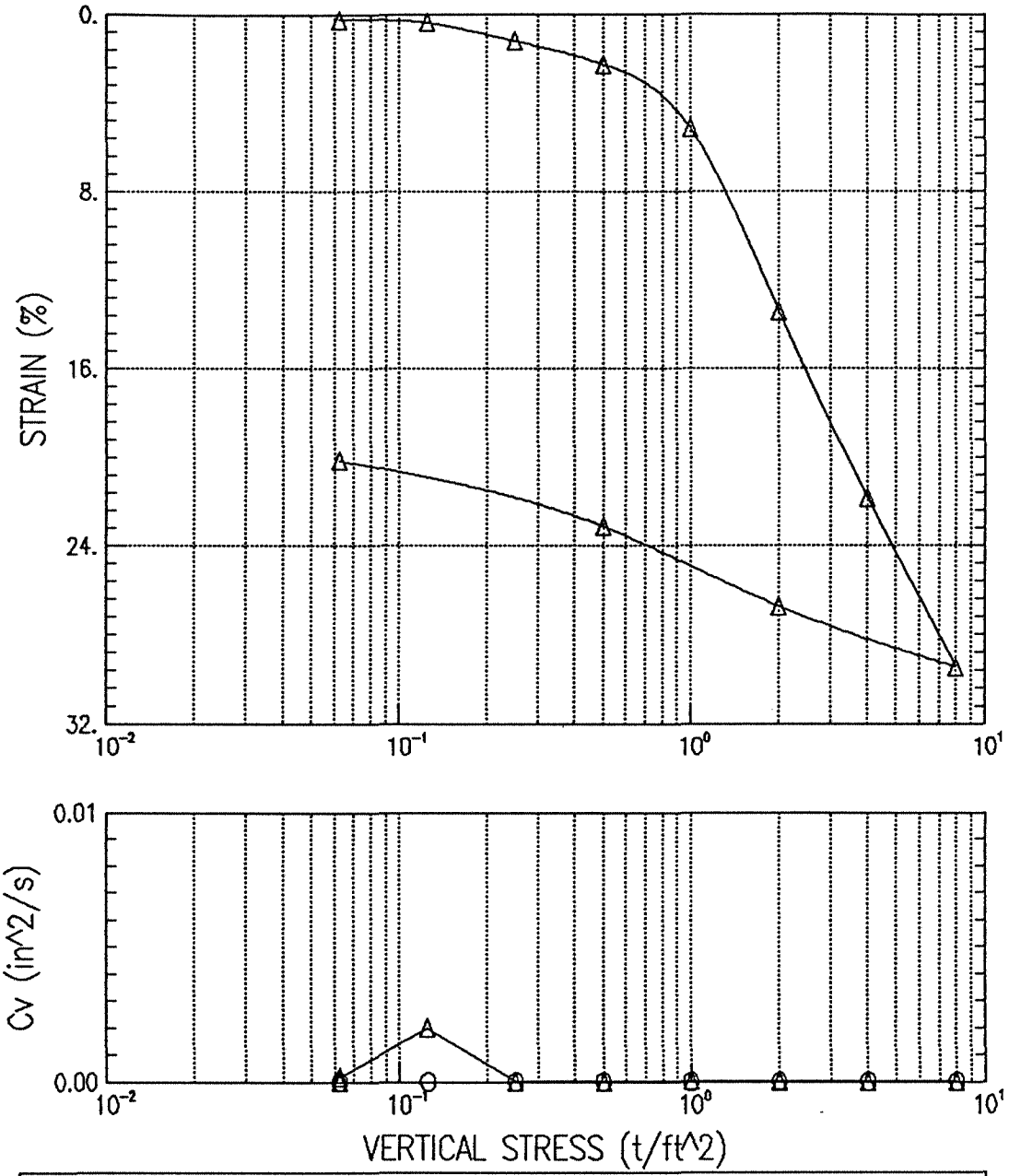
FIGURE: A-9

Sheet 2 of 2



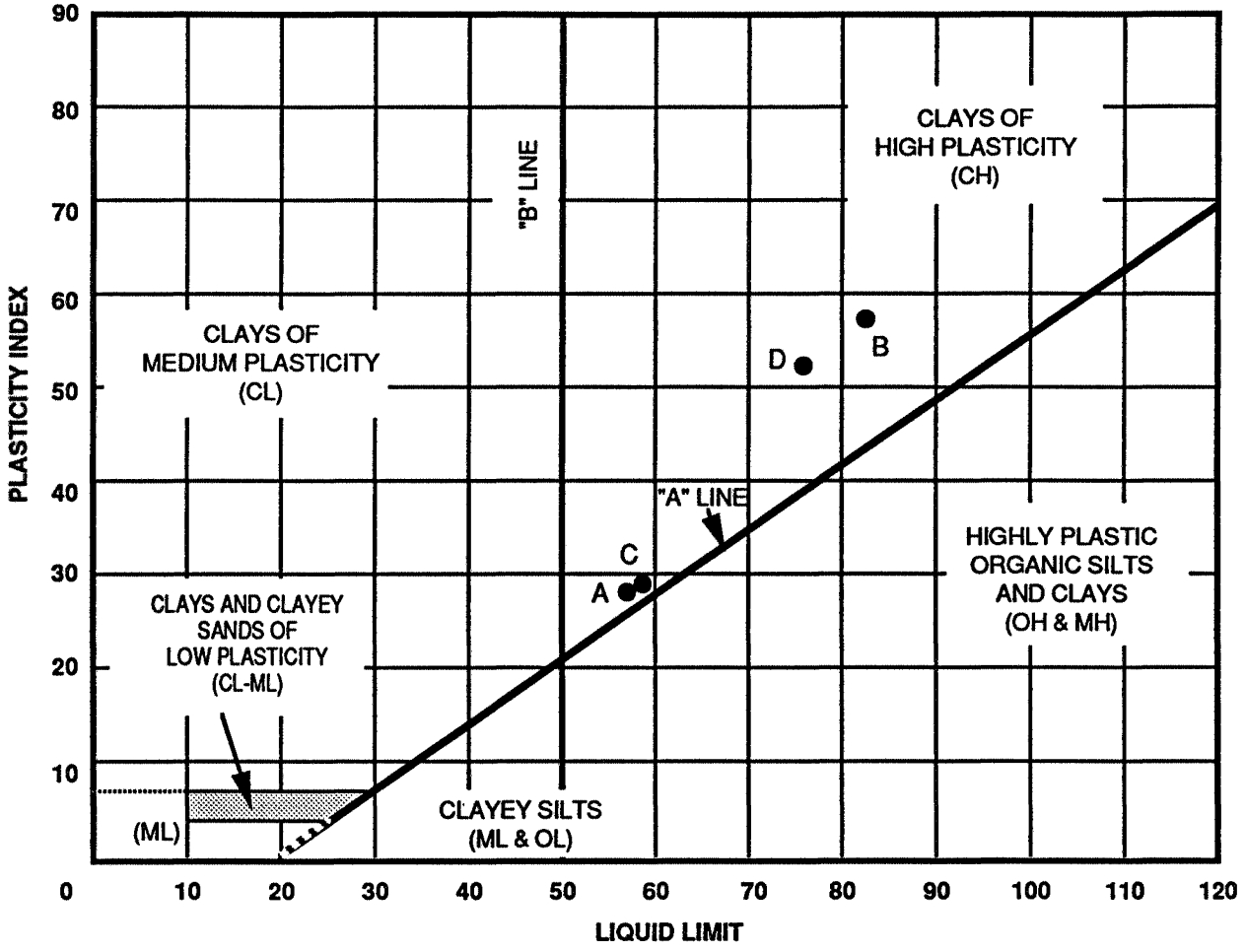
Woodward Clyde Consultants
Project Name : S.C.V.W.D. STORAGE YARD
Project No : 91C0588R Boring No : B1-8 Sample No : B1-8
Test Date : 04/22/92 Test No : B1-8 Depth : 14-16.5 FT
Description : BROWN SLIGHTLY GRAY SILTY CLAY

Project No. 91C-0588R **Woodward-Clyde Consultants**	PARKING LOT EXPANSION SANTA CLARA VALLEY WATER DISTRICT San Jose, California	Figure A-10



Woodward Clyde Consultants
Project Name : SCVWD STORAGE YARD
Project No : 91C0588R Boring No : B1-10 Sample No : B1-10
Test Date : 04/22/92 Test No : B1-10 Depth : 18-20 FEET
Description : GRAYISH BROWN SILTY CLAY -CH-

Project No. 91C-0588R **Woodward-Clyde Consultants**	PARKING LOT EXPANSION SANTA CLARA VALLEY WATER DISTRICT San Jose, California	Figure A-11



SAMPLE IDENTIFICATION				ATTERBERG LIMITS		
LETTER DESIG'N	BORING NO.	SAMPLE NO.	DEPTH, FT.	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
A	B-1	8	15	57	29	28
B	B-1	10	19	91	34	57
C	B-2	6	12	58	29	29
D	B-2	8	18	86	34	52

NOTE: Test performed on sample portion finer than US Sieve Size No. 40

Project No. 91C-0588R **Woodward-Clyde Consultants**	PLASTICITY CLASSIFICATION PARKING LOT EXPANSION SANTA CLARA VALLEY WATER DISTRICT San Jose, California	Figure A-12

Project Name SANTA CLARA VALLEY WATER DISTRICT

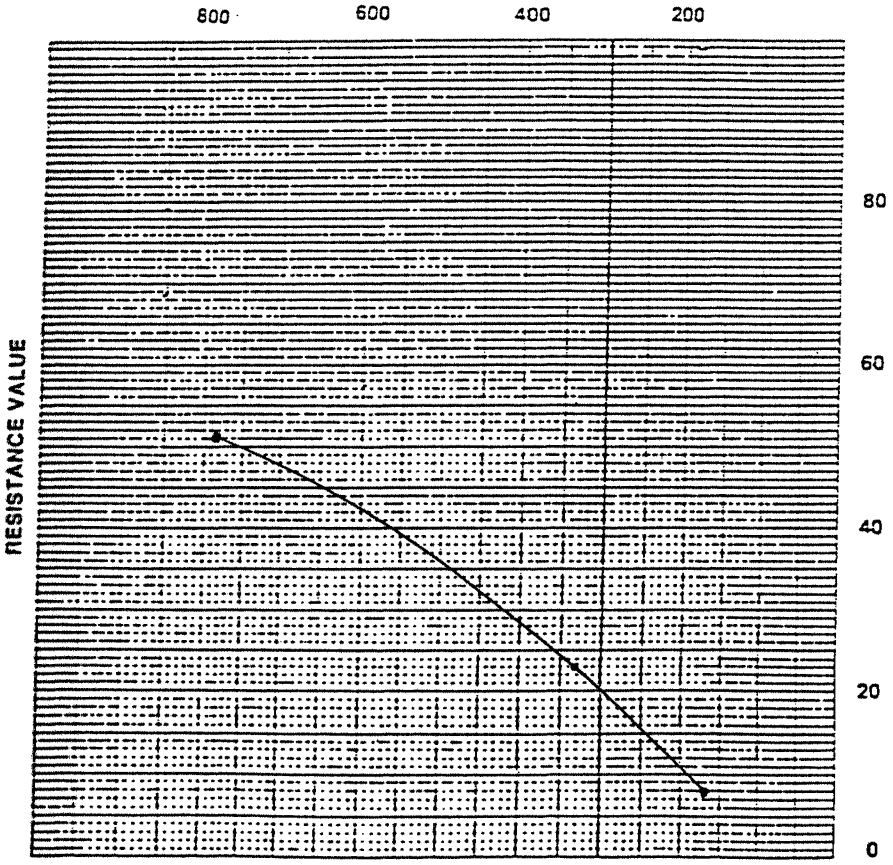
Date 05/22/92

Project Number 91C0588R-G200

Sample Number 2 Near B-1 Depth

R-Value @ 300 psi 20

Resistance Value Test



Compactor Pressure psi	300	175	100
Moisture @ Compaction %	9.0	10.0	11.2
Dry Density @ Compaction pcf	137.3	135.9	134.3
Exudation Pressure, psi	784	334	167
Resistance Value "R"	51	23	8
Expansion, Dial Reading .00	95	40	13
Expansion, psf	415	175	57

GRADING ANALYSIS

Percent Passing

Sieve Size	As Rcvd.	As Tested	As Rcvd. Specified Limits
3"			
2½			
2			
1½			
1			
3/4			
1/2			
3/8			
#4			
8			
16			
30			
50			
100			
200(wash)			

Sand Equivalent Test (Aver. of 3)

S.E. SPECIFIED (MINIMUM)

Design R-Value

R-Value (By Exudation Pressure)

Exudation Specified Minimum

Durability Index

Coarse Durability

Fine Durability

Durability Index

Specified Minimum

Project No. 91C-0588R **Woodward-Clyde Consultants**	PARKING LOT EXPANSION SANTA CLARA VALLEY WATER DISTRICT San Jose, California	Figure A-13

Project Name SANTA CLARA VALLEY WATER DISTRICT

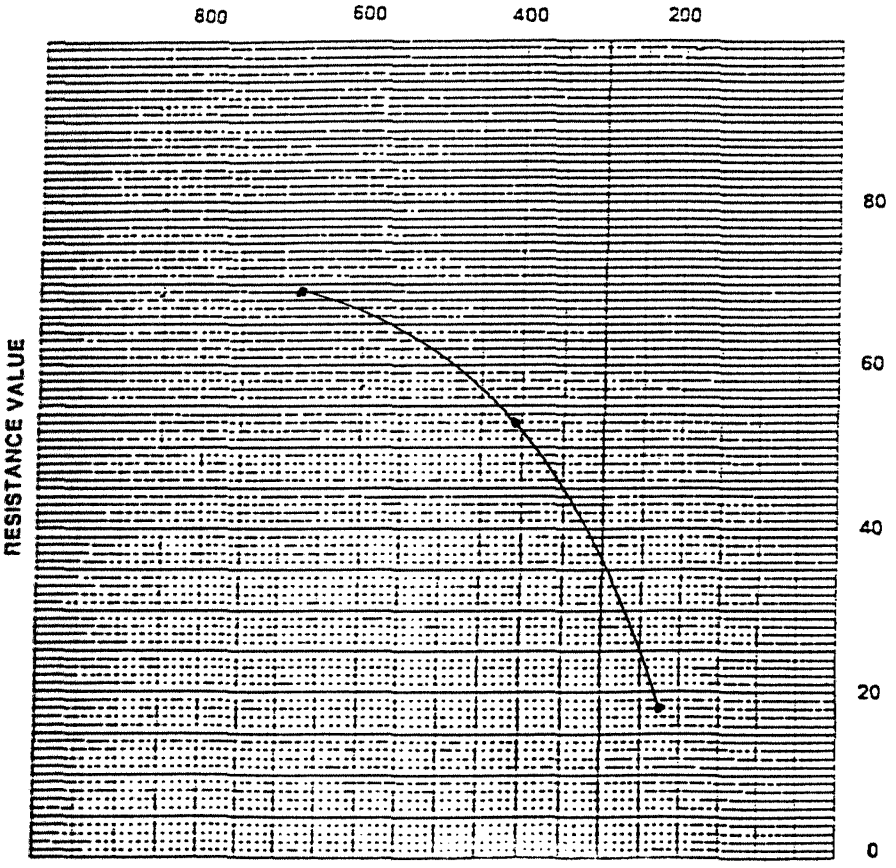
Project Number 91C0588R-G200

Sample Number 1 Near B-2 Depth

Date 05/22/92

R-Value @ 300 psi 36

Resistance Value Test



Compactor Pressure psi	325	250	175
Moisture @ Compaction %	7.7	8.4	9.2
Dry Density @ Compaction pcf	136.5	136.4	135.2
Exudation Pressure, psi	688	410	227
Resistance Value "R"	69	53	18
Expansion, Dial Reading .00	42	17	5
Expansion, psf	183	74	22

GRADING ANALYSIS

Percent Passing

Sieve Size	As Rcvd.	As Tested	As Rcvd. Specified Limits
3"			
2½			
2			
1½			
1			
3/4			
1/2			
3/8			
#4			
8			
16			
30			
50			
100			
200(wash)			

Sand Equivalent Test (Aver. of 3)

S.E. SPECIFIED (MINIMUM)

Design R-Value

R-Value (By Exudation Pressure)

Exudation Specified Minimum

Durability Index

Coarse Durability

Fine Durability

Durability Index

Specified Minimum

Project No. 91C-0588R **Woodward-Clyde Consultants**	PARKING LOT EXPANSION SANTA CLARA VALLEY WATER DISTRICT San Jose, California	Figure A-14

APPENDIX B

APPENDIX B
LOGS OF EXPLORATORY BORINGS AN PITS FOR PREVIOUS INVESTIGATIONS

Project: SCVWD Office Building
San Jose, California

Log of Boring No. 1

Date Drilled: 2/19/91

Remarks:

Type of Boring: 8" Hollow Stem

Hammer: 140-pound donut

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			Surface Elevation:			
			SILTY TO CLAYEY SAND FILL (SM-SC) Well compacted, brown, damp, some angular gravel to 1/2"			
		36		6	129	--
			SILTY CLAY FILL (CL) Moderately to well compacted, damp, brown, some medium to coarse sand, trace angular gravel to 3/4"			
5		31		8	127	--
10		P	SILTY CLAY FILL (CL-CH) "SLIMES" Soft, wet, gray, trace organics	86	48	--
15		36	CLAYEY SAND AND GRAVEL (GC-SC) Medium dense, wet, gray-brown, subangular, maximum gravel to 1", medium to coarse sand	6	125	--
20		38	ATD SANDY GRAVEL TO GRAVELLY SAND (GP-SP) Medium dense, wet, brown, subangular, maximum particle size 2", medim to coarse sand, little silt and clay	--	--	--
25			Bottom of Boring at 21-1/2 feet			
30						

Project: 91C-0068-S | **Woodward-Clyde Consultants** | Figure 2

Project: SCVWD Office Building
San Jose, California

Log of Boring No. 2

Date Drilled: 2/19/91

Remarks:

Type of Boring: 8" Hollow Stem

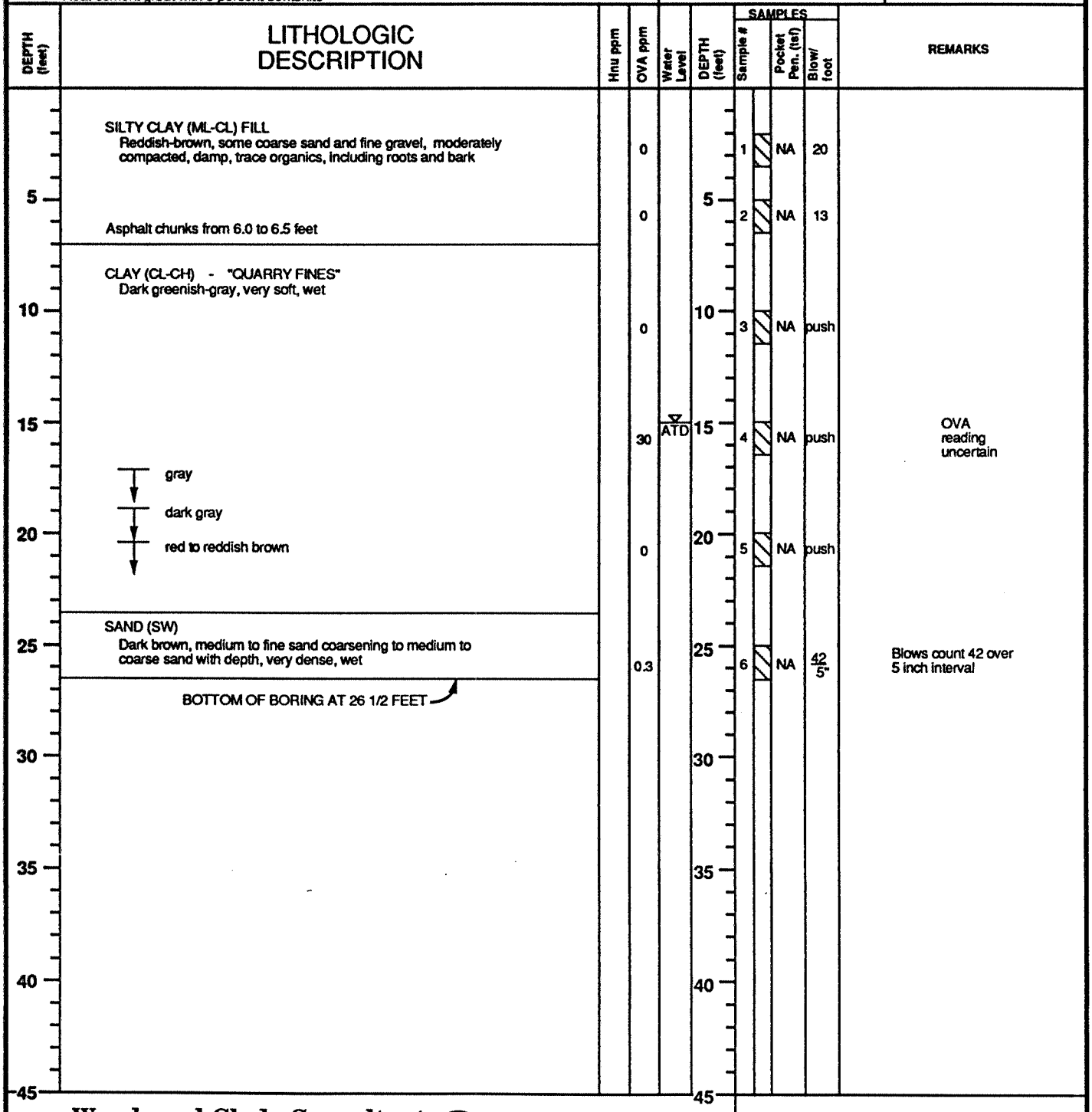
Hammer: 140-pound donut

Depth Ft	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			Surface Elevation:			
		37	SILTY CLAY FILL (CL) Well compacted, damp to moist, brown, some medium to coarse sand , trace angular gravel to 1-1/2"	9	126	--
5		24	CLAYEY SILT FILL (CL-ML) Moderately compacted, moist, brown,some medium to coarse sand, trace gravel to 3/4"	12	99	--
10		3	SILTY CLAY FILL (CL-CH) "SLIMES" Soft, wet, dark brown to olive gray, some coarse sand and fine gravel	27	93	--
15		P P	SILTY CLAY FILL (CH) "SLIMES" Soft, wet, olive gray, no recovery from 15' to 16-1/2'	67	58	--
20		36	SANDY GRAVEL TO GRAVELLY SAND (GP-SP) Dense, wet, light brown to brown, subangular gravel to 2" , medium to coarse sand, little silt and clay	--	--	--
25		51		--	--	--
30			Bottom of boring at 26-1/2 ' Boring dry upon completion			

Project: 91C-0068-S | **Woodward-Clyde Consultants** | Figure 3

PROJECT NAME: Environmental Services: Storage Yard and North Pond, S.C.V.W.D.

BORING LOCATION South end of storage yard		**GROUND SURFACE ELEVATION** 191.58 feet above mean sea level	
DRILLING AGENCY HEW Drilling Co.		**DATE STARTED** 2-14-91 **DATE FINISHED** 2-14-91	
DRILLER Jasper		**COMPLETION DEPTH** 26.5 feet	**HAMMER** 140 lb
DRILLING EQUIPMENT CME 55		**NO. OF SAMPLES** **DISTURBED** 0	**UNDISTURBED** 8
DRILLING METHOD Hollow Stem Auger		**WATER DEPTH** **FIRST** 15 feet	**COMPL.** NA
DRILL BIT 6-Inch		**LOGGED BY:** Charles Conway,R.G. 4530	**LOG OF BORING NO.** 91-1
SIZE AND TYPE OF CASING NA			
TYPE OF BACKFILL MATERIAL Neat cement grout with 5 percent bentonite		**CHECKED BY:** Alan Lattanner,RG. 4599	



Woodward-Clyde Consultants

Project No. 91C-0068-R FIGURE:

PROJECT NAME: Environmental Services: Storage Yard and North Pond, S.C.V.W.D.

BORING LOCATION 5 feet west of boring 91-1	**GROUND SURFACE ELEVATION** 191.70 feet above mean sea level
DRILLING AGENCY HEW Drilling Co.	**DATE STARTED** 2-19-91 **DATE FINISHED** 2-19-91
DRILLER Jeff	**COMPLETION DEPTH** NA / **HAMMER** 140 lb
DRILLING EQUIPMENT CME 55	**NO. OF SAMPLES** DISTURBED 1 / UNDISTURBED 1
DRILLING METHOD Hollow Stem Auger	**WATER DEPTH** FIRST 15 feet / COMPL. NA
DRILL BIT 6-Inch	**LOGGED BY:** Charles Conway, R.G.4530
SIZE AND TYPE OF CASING NA	**LOG OF BORING NO.** 91-1A
TYPE OF BACKFILL MATERIAL Neat cement grout with 5 percent bentonite	**CHECKED BY:** Alan Lattanner, R.G. 4599

DEPTH (feet)	LITHOLOGIC DESCRIPTION	Hnu ppm	OVA ppm	Water Level	DEPTH (feet)	SAMPLES Sample #	Pocket Pen. (tsf)	Blow/ foot	REMARKS
0	SILTY CLAY (ML-CL) FILL Reddish brown, some coarse sand and fine gravel, moderately compacted, damp, trace organics, including roots and bark				0				
5	Asphalt chunks from 6.0 to 6.5 feet				5				
	CLAY (CL-CH) - "QUARRY FINES" Dark greenish-gray, very soft, wet								
10			0		10	1	NA	push	Logged cuttings only, because purpose of boring was to collect one moisture content sample and one 5-gallon bucket grab sample for analysis
15	BOTTOM OF BORING AT 15 FEET				15				
20					20				
25					25				
30					30				
35					35				
40					40				
45					45				

Woodward-Clyde Consultants

Project No. 91C-0068-R FIGURE:

PROJECT NAME: Environmental Services: Storage Yard and North Pond, S.C.V.W.D.

BORING LOCATION South quarter of storage yard	**GROUND SURFACE ELEVATION** 192.25 feet above mean sea level		
DRILLING AGENCY HEW Drilling Co.	**DATE STARTED** 2-14-91 **DATE FINISHED** 2-14-91		
DRILLER Jasper	**COMPLETION DEPTH** 26.5 feet	**HAMMER** 140 lb	
DRILLING EQUIPMENT CME 55	**NO. OF SAMPLES**	**DISTURBED** 0	**UNDISTURBED** 11
DRILLING METHOD Hollow Stem Auger	**WATER DEPTH**	**FIRST** 24 feet	**COMPL.** NA
DRILL BIT 6-inch	**LOGGED BY:** Charles Conway, R.G. 4530	**LOG OF BORING NO.** 91-2	
SIZE AND TYPE OF CASING NA			
TYPE OF BACKFILL MATERIAL Neat cement grout with 5 percent bentonite	**CHECKED BY:** Alan Lattanner, R.G. 4599		

DEPTH (feet)	LITHOLOGIC DESCRIPTION	Hnu ppm	OVA ppm	Water Level	DEPTH (feet)	SAMPLES Sample #	Pocket Pen. (tsf)	Blow/ foot	REMARKS
0	CLAYEY SILT (ML-CL) FILL Dark gray to black, some fine gravels, trace organics moderately to well compacted, damp		1.5		0	1	NA	28	
5	coarsens and becomes brown with depth Asphalt chunks from 6.0 to 6.5 feet		2.6		5	2	NA	50	
10	SILTY CLAY (CH) - "QUARRY FINES" Dark greenish gray with occassional thin silt layers, very soft, wet		2.0		10	3	NA	push	
15	dark gray		66		15	4	NA	push	
20	light brown		2.2		20	5	NA	push	
25	SAND (SW) Dark brown, fine to medium grading to medium to coarse sand, some angular gravel, maximum size 3/4", dense, wet		8.8	ATD	25	6	NA	45	
30	BOTTOM OF BORING AT 26 1/2 FEET				30				
35					35				
40					40				
45					45				

Woodward-Clyde Consultants

Project No. 91C-0068-R FIGURE:

PROJECT NAME: Environmental Services: Storage Yard and North Pond, S.C.V.W.D.

BORING LOCATION Near middle of storage yard	**GROUND SURFACE ELEVATION** 191.55 feet above mean sea level		
DRILLING AGENCY HEW Drilling Co.	**DATE STARTED** 2-14-91 **DATE FINISHED** 2-14-91		
DRILLER Jasper	**COMPLETION DEPTH** 26.5 feet		**HAMMER** 140 lb
DRILLING EQUIPMENT CME 55	**NO. OF SAMPLES** **DISTURBED**		**UNDISTERBED** 8
DRILLING METHOD Hollow Stem Auger	**WATER DEPTH** **FIRST** 22.4 feet		**COMPL.** NA
DRILL BIT 6-Inch	**LOGGED BY:** Charles Conway R.G. 4530		**LOG OF BORING NO.** 91-3
SIZE AND TYPE OF CASING NA			
TYPE OF BACKFILL MATERIAL Neat cement grout with 5 percent bentonite	**CHECKED BY:** Alan Lattanner R.G. 4599		

DEPTH (feet)	LITHOLOGIC DESCRIPTION	Hnu ppm	OVA ppm	Water Level	DEPTH (feet)	SAMPLES Sample #	Pocket Pen. (tsf)	Blow/ foot	REMARKS
5	CLAYEY SILT (ML-CL) FILL Brown grading to black with depth, some fine to medium gravels, moderately compacted, damp		8.0		5	1	NA	25	
	Asphalt chunks from 6.0 to 6.5 feet		120			2	NA	26	
10	CLAY (CL - CH) - "QUARRY FINES" Dark greenish-gray, very soft, wet, trace organics (wood)		130		10	3	NA	3	
15	light greenish gray grading to red with depth		2.0		15	4	NA	push	
20	red to dark brown		0	ATD	20	5	NA	push	
25	GRAVEL (GW) Dark brown to brown, some medium to coarse sand, maximum gravel, 1 1/2" to 2" diameter, very dense, wet		0		25	6	NA	50	Insufficient sample No OVA reading
	BOTTOM OF BORING AT 26 1/2 FEET								
30					30				
35					35				
40					40				
45					45				

Woodward-Clyde Consultants

Project No. 91C-0068-R FIGURE:

PROJECT NAME: Environmental Services: Storage Yard and North Pond, S.C.V.W.D.

BORING LOCATION North end of storage yard		**GROUND SURFACE ELEVATION** 192.33 feet above mean sea level	
DRILLING AGENCY HEW Drilling Co.		**DATE STARTED** 2-15-91 **DATE FINISHED** 2-15-91	
DRILLER Casto		**COMPLETION DEPTH** 31.5 feet	**HAMMER** 140 lb
DRILLING EQUIPMENT CME 55		**NO. OF SAMPLES** **DISTURBED**	**UNDISTURBED** 9
DRILLING METHOD Hollow Stem Auger		**WATER DEPTH** **FIRST** 11.2 feet	**COMPL.** NA
DRILL BIT 6-inch		**LOGGED BY:** Charles Conway, R.G. 4530	**LOG OF BORING NO.** 91-4
SIZE AND TYPE OF CASING NA			
TYPE OF BACKFILL MATERIAL Neat cement grout with 5 percent bentonite		**CHECKED BY:** Alan Lattanner, R.G. 4599	

DEPTH (feet)	LITHOLOGIC DESCRIPTION	Hnu ppm	OVA ppm	Water Level	DEPTH (feet)	SAMPLES Sample #	Pocket Pen. (tsf)	Blow/ foot	REMARKS
0	SILTY CLAY (ML-CL) FILL Red to reddish brown, some fine to medium rounded gravels, moderately to well compacted, damp		0.6		0	1	NA	33	
5	GRAVELLY CLAY (ML - CL) FILL Light brown to dark greenish-gray, some rounded to angular coarse to medium gravel, maximum size 3/4", moderately to well compacted, damp		0.8		5	2	NA	33	
10	SILTY CLAY (ML - CL) - FILL Dark brown to olive-green, trace rounded fine to medium gravel, maximum size 1", moderately compacted, moist to wet Asphalt chunks from 10.7 to 10.9 ft.		0.8	ATD	10	3	NA	10	
15	CLAY (CL - CH) - "QUARRY FINES" Red to reddish-brown, very soft, wet		1.6		15	4	NA	push	
20	red with dark gray mottling		0.6		20	5	NA	push	
25	GRAVEL (GW) Gray, trace fine sand and silt, some coarse to medium sand, dense, wet		1.4		25	6	NA	43	
30	SAND (SW) Brown, trace fine sand and silt, trace rounded gravels, maximum size 3/4", dense, wet		NA		30	7	NA	42	
35	BOTTOM OF BORING AT 31 1/2 FEET				35				
40					40				
45					45				

Woodward-Clyde Consultants

Project No. 91C-0068-R FIGURE:

PROJECT NAME: Environmental Services: Storage Yard and North Pond, S.C.V.W.D.

BORING LOCATION On service road near north end of pond	**GROUND SURFACE ELEVATION** 194.17 feet above mean sea level	
DRILLING AGENCY HEW Drilling Co.	**DATE STARTED** 2-18-91 **DATE FINISHED** 2-18-91	
DRILLER Jeff	**COMPLETION DEPTH** 26.5 feet	**HAMMER** 140 lb
DRILLING EQUIPMENT CME 55	**NO. OF SAMPLES** **DISTURBED**	**UNDISTURBED** 9
DRILLING METHOD Hollow Stem Auger	**WATER DEPTH** **FIRST** 17 feet	**COMPL.** NA
DRILL BIT 6-inch	**LOGGED BY:** Charles Conway, R.G. 4530	**LOG OF BORING NO.**
SIZE AND TYPE OF CASING NA		
TYPE OF BACKFILL MATERIAL Neat cement grout with 5 percent bentonite	**CHECKED BY:** Alan Lattanner, R.G. 4599	91-5

DEPTH (feet)	LITHOLOGIC DESCRIPTION	Hnu ppm	OVA ppm	Water Level	DEPTH (feet)	SAMPLES Sample #	Pocket Pen. (tsf)	Blow/ foot	REMARKS
0	SILTY CLAY (CL) FILL Light brown to dark greenish-gray, trace medium to coarse sand, moderately well compacted, damp, trace wood and roots		0.2		0	1	NA	10	
5	CLAY (CL - CH) - "QUARRY FINES" Light brown, very soft, wet		0.2		5	2	NA	push	
10	Black, some thin silt layers, some organic material		0.8		10	3	NA	push	
15	Dark gray to black, some bark fragments		9.8	ATD	15	4	NA	push	
20	GRAVEL (GW) Dark gray, maximum size 1 3/4", some medium to coarse sand, dense, wet		0.2		20	5	NA	41	
25	GRAVEL (GP) Light brown, angular gravels, maximum size 1", some silt, clay, fine sand, medium dense, wet		0.7		25	6	NA	28	
	BOTTOM OF BORING AT 26 1/2 FEET								
30					30				
35					35				
40					40				
45					45				

Woodward-Clyde Consultants

Project No. 91C-0068-R FIGURE:

PROJECT NAME: Environmental Services: Storage Yard and North Pond, S.C.V.W.D.

BORING LOCATION On service road near middle of pond	**GROUND SURFACE ELEVATION** 192.72 feet above mean sea level		
DRILLING AGENCY HEW Drilling Co.	**DATE STARTED** 2-18-91 **DATE FINISHED** 2-18-91		
DRILLER Jeff	**COMPLETION DEPTH** 26.5 feet		**HAMMER** 140 lb
DRILLING EQUIPMENT CME 55	**NO. OF SAMPLES**	**DISTURBED**	**UNDISTURBED** 10
DRILLING METHOD Hollow Stem Auger	**WATER DEPTH**	**FIRST** 10 feet	**COMPL.** NA
DRILL BIT 6-inch	**LOGGED BY:** Charles Conway, R.G. 4530		**LOG OF BORING NO.** 91-6
SIZE AND TYPE OF CASING NA			
TYPE OF BACKFILL MATERIAL Neat cement grout with 5 percent bentonite	**CHECKED BY:** Alan Lattanner, R.G. 4599		

DEPTH (feet)	LITHOLOGIC DESCRIPTION	Hnu ppm	OVA ppm	Water Level	DEPTH (feet)	SAMPLES Sample #	Pocket Pen. (tsf)	Blow/ foot	REMARKS
5	SILTY CLAY (CL) FILL Brown to dark gray, some medium to coarse sand and fine to medium gravel, maximum gravel size 1", moderately well compacted, damp, trace roots, leaves		0.2		5	1	NA	20	
			0.3			2	NA	11	
10	SILTY CLAY (CL) - "QUARRY FINES" Brown with light brown, mottling, poorly compacted near overlying interface, moist, softening with depth Dark greenish-gray, some fine sand layers, very soft, wet, trace roots, other organics,		17	ATD	10	3	NA	push	
15	Gray with black streaks, some thin silt layers, very soft, wet		42		15	4	NA	push	
			600						OVA reading on air from borehole; No odors.
20	Gray with light brown to light gray mottling		0.6		20	5	NA	push	
			600						OVA reading on air from borehole at 600 ppm; No odors
25	GRAVEL (GW) Light brown, angular gravels maximum size 1 3/4", some medium to coarse sand, dense, wet		NA		25	6	NA	40	
	BOTTOM OF BORING AT 26 1/2 FEET								
30					30				
35					35				
40					40				
45					45				

Woodward-Clyde Consultants

Project No. 91C-0068-R FIGURE:

PROJECT NAME: Environmental Services: Storage Yard and North Pond, S.C.V.W.D.

BORING LOCATION Between pond and storage yard	**GROUND SURFACE ELEVATION** 191.57 feet above mean sea level		
DRILLING AGENCY HEW Drilling Co.	**DATE STARTED** 2-18-91 **DATE FINISHED** 2-18-91		
DRILLER Jeff	**COMPLETION DEPTH** 26.5 feet		**HAMMER** 140 lb
DRILLING EQUIPMENT CME 55	**NO. OF SAMPLES**	**DISTURBED**	**UNDISTURBED** 8
DRILLING METHOD Hollow Stem Auger	**WATER DEPTH**	**FIRST** 10 feet	**COMPL.** NA
DRILL BIT 6-Inch	**LOGGED BY:** Charles Conway,R.G. 4530		**LOG OF BORING NO.** 91-7
SIZE AND TYPE OF CASING NA			
TYPE OF BACKFILL MATERIAL Neat cement grout with 5 percent bentonite	**CHECKED BY:** Alan Lattanner, R.G. 4599		

DEPTH (feet)	LITHOLOGIC DESCRIPTION	Hnu ppm	OVA ppm	Water Level	DEPTH (feet)	SAMPLES Sample #	Pocket Pen. (tsf)	Blow/ foot	REMARKS
0	SAND (SW) FILL Brown to olive gray, some gravel, maximum size 1 1/4", some silt and clay, uncompacted, wet, some organics, including wood chips		0.2		0	1	NA	3	
5	coarsens Olive green to gray, maximum gravel size 1 1/2", trace silt and clay, uncompacted, wet		4.8		5	2	NA	6	
10	CLAY (CH) - "QUARRY FINES" Dark greenish gray with light brown mottling to olive-green, very soft, wet		0.3	ATD	10	3	NA	push	
15	Gray to light gray		55		15	4	NA	push	
20	SILTY CLAY (ML - CL) - "QUARRY FINES" Brown, very soft, wet		0		20	5	NA	push	
25	GRAVELLY SAND (SW) Light brown to brown, rounded gravels maximum size 1 1/2", trace silt and clay, dense, wet		0.2		25	6	NA	38	
	BOTTOM OF BORING AT 26 1/2 FEET								
30					30				
35					35				
40					40				
45					45				

Woodward-Clyde Consultants

Project No. 91C-0068-R FIGURE:

PROJECT NAME: Environmental Services: Storage Yard and North Pond, S.C.V.W.D.

BORING LOCATION Adjacent to service road, 20 feet south of pond	**GROUND SURFACE ELEVATION** 191.16 feet above mean sea level		
DRILLING AGENCY HEW Drilling Co.	**DATE STARTED** 2-15-91 **DATE FINISHED** 2-15-91		
DRILLER Castro	**COMPLETION DEPTH** 16.5 feet		**HAMMER** 140 lb
DRILLING EQUIPMENT CME 55	**NO. OF SAMPLES**	**DISTURBED**	**UNDISTURBED** 8
DRILLING METHOD Hollow Stem Auger	**WATER DEPTH**	**FIRST** 3 feet	**COMPL.** NA
DRILL BIT 6-inch	**LOGGED BY:** Charles Conway, R.G. 4530		**LOG OF BORING NO.** 91-8
SIZE AND TYPE OF CASING NA			
TYPE OF BACKFILL MATERIAL Neat cement grout with 5 percent bentonite	**CHECKED BY:** Alan Lattanner, R.G.4599		

DEPTH (feet)	LITHOLOGIC DESCRIPTION	Hnu ppm	OVA ppm	Water Level	DEPTH (feet)	SAMPLES Sample #	Pocket Pen. (tsf)	Blow/ foot	REMARKS
0	CLAY (CL) FILL Brown, trace of roots and other organics, trace fine rounded gravels, poorly compacted, moist		0.3	ATD	0	1	NA	8	
5	CLAY (CL - CH) - "QUARRY FINES" Light brown, trace of roots and bark with other organics, soft, moist		0.4		5	2	NA	4	
10	Light greenish gray with light brown mottling		0		10	3	NA	push	
15	SAND (SP) Light brown to light greenish-gray fine grained, very loose, wet coarsens				15				
	SANDY GRAVEL (SW) Brown, maximum 1.5" diameter, gravel with trace silt and clay, dense, wet, some red oxidation marks		0.1			4	NA	35	
20	BOTTOM OF BORING AT 16 1/2 FEET				20				
25					25				
30					30				
35					35				
40					40				
45					45				

Woodward-Clyde Consultants

Project No. 91C-0068-R FIGURE:

Project: SANTA CLARA VALLEY WATER DISTRICT
San Jose, California

Log of Boring No.1

Date Drilled: 12-21-88
Type of Boring: 6" Auger
Hammer:

Remarks:
Location:

Surface Elevation:190.0

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			SANDY GRAVEL FILL Poorly compacted, wet, brown (Drill Pad)			
5	1	7	SILTY CLAY (CL) Firm, wet, black-dark brown, roots, grass ▽ ATD			
			SILTY CLAY (CL) FILL "SLIMES" Soft, wet, brown with gray mottling,with sand and roots			
10	2	3		49	72	
15	3	P	Very soft, very wet, gray with black mottling LL=80 PI=45	87	49	
20	4	P	Very soft, very wet, gray -brown, with sand and wood fragments	46	71	
25	5		GRAVEL (GW-GP) Very dense, wet, brown			
			BOTTOM OF HOLE @ AT 27 FEET			
30						
35						
40						

Project: 8810192-R | Woodward-Clyde Consultants | Figure 3

Project: SANTA CLARA VALLEY WATER DISTRICT
San Jose, California

Log of Boring No. 2

Date Drilled: 12-21-88
Type of Boring: 6" Auger
Hammer:

Remarks:

Location:

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			Surface Elevation: 193.2			
			SANDY GRAVEL FILL Poorly compacted, moist-wet, brown (Drill Pad) Wet			
5	1	2	SILTY CLAY with organics, reeds			
			CLAYEY SILT (CL) FILL "SLIMES" Very soft, very wet, brown to gray ATD			
10	2	P				
			SANDY SILT (ML) Very soft, very wet, brown to gray PI=N.P.	36	87	
15	3	P				
			SILTY CLAY (CL) Soft, very wet, brown			
20	4	2				
			GRAVEL (GP-GW) Very dense, wet, gray-brown			
25	5	69				
			CLAYEY SAND (SC) Very dense, wet, red brown, some gravel			
30	6	52				
			BOTTOM OF HOLE @ AT 31-1/2 FEET			
35						
40						

Project: 8810192-R | Woodward-Clyde Consultants | Figure 4

Project: SANTA CLARA VALLEY WATER DISTRICT
San Jose, California

Log of Boring No. 3

Date Drilled: 12-21-88
Type of Boring: 6" Auger
Hammer:

Remarks:
Location:

Surface Elevation:194.0

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			SANDY GRAVEL FILL (SP) Poorly compacted, damp, gray-brown			
			SILTY SAND FILL (SM) Poorly compacted, moist, gray to brown, some organics			
5	1	19	GRAVELLY SAND FILL (SP) Poorly compacted, damp, black, chunks of asphalt pavement			
10	2	12	ATD	16	106	
15	3	2	CLAYEY SILT (ML-CL) "SLIMES" Soft, very wet, gray with black mottling, little fine sand -200=89%			
20			SANDY GRAVEL FILL (GP-GW) Poorly compacted, brown to black			
25	4	41	CLAYEY GRAVEL FILL (GP-GC) Dense, wet, dark brown-black, asphalt and brick fragments	10	121	
30	5	57	CLAYEY GRAVEL (GP-GC) Very dense, wet, red brown to gray			
			BOTTOM OF HOLE @ AT 31-1/2 FEET			
35						
40						

Project: SANTA CLARA VALLEY WATER DISTRICT
San Jose, California

Log of Boring No.4

Date Drilled: 12-21-88
Type of Boring: 6" Auger
Hammer:

Remarks:

Location:

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			Surface Elevation: 193.7			
5	1	12	SANDY GRAVEL FILL (GP) Poorly compacted gray brown, asphalt fragments Becoming dark brown-black			
10	2	74	CLAYEY GRAVEL FILL (GC) Poorly compacted, wet, red brown CLAYEY GRAVEL FILL (GC) Poorly Compacted, moist-wet, some glass and rock fragments to 9"			
15			SILTY CLAY (CL) Very soft, very wet, red-brown Turning gray to black Refusal; unable to advance boring below 15 feet Moved 6 feet to the southwest; drilled to 15 feet and again met refusal Boring abandoned after second refusal			
20						
25						
30						
35						
40						

Project: SANTA CLARA VALLEY WATER DISTRICT
San Jose, California

Log of Exploratory Pit No. 1

Date Excavated : 12-20-88 Remarks :

Type of Excavation : Backhoe

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			Surface Elevation:191.7			
			CLAYEY GRAVEL FILL (GC) Poorly compacted, damp, brown, cobbles to 4", asphalt, etc.			
	1		SILTY CLAY FILL (CL) Poorly compacted, damp, dark brown, some sand occasional gravel, tree roots			
	2		SILT FILL (ML) Poorly compacted, damp, gray, many tree roots			
5	3		SILTY CLAY FILL (CL) Poorly compacted, damp, organic, dark brown to black, occasional gravel, some plant roots			
	4		CLAYEY SILT FILL (ML) Moderately compacted, damp, brown with gray mottling, some sand, plant roots			
	5		SILTY CLAY TO CLAY (CL-CH) "SLIMES" Soft, moist, tan and gray			
			BOTTOM OF PIT @ 8FEET NO GROUND WATER ENCOUNTERED			
10						
15						

Project: 8810192-R | Woodward-Clyde Consultants | Figure 18

Project: SANTA CLARA VALLEY WATER DISTRICT
San Jose, California

Log of Exploratory Pit No. 2

Date Excavated : 12-20-88

Remarks :

Type of Excavation : Backhoe

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			Surface Elevation:			
	1		GRAVELLY CLAY FILL (CL) Poorly compacted, damp, brown, sandy, rubble, bolders to 12"			
	2		SANDY CLAY FILL (CL) Poorly compacted, damp, brown and reddish brown, gravelly, mixed materials of fill, asphalt chunks to 2"			
5	3		SILTY CLAY FILL (CL) Poorly compacted, moist, dark brown to black, organics and tree roots, occasional gravel Grades to (CH) moist, gray and tan			
	4		SILTY CLAY (CH) "SLIMES" Soft, damp, gray and brown mottled			
			BOTTOM OF PIT @ 8 FEET NO GROUNDWATER ENCOUNTERED			
10						
15						

Project: 8810192-R | Woodward-Clyde Consultants | Figure 19

Project: SANTA CLARA VALLEY WATER DISTRICT
San Jose, California

Log of Exploratory Pit No. 3

Date Excavated : 12-20-88

Remarks :

Type of Excavation : Backhoe

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			Surface Elevation: 191.7			
	1		GRAVELLY CLAY FILL (CL) Poorly compacted, damp, light brown to dark brown, sandy, asphalt chunks, cobbles to 12"			
5	2		SILTY SAND FILL (SM) Poorly compacted, damp, light brown, gravelly, some asphalt chunks			
	3					
	4		SILTY CLAY FILL (CL) Poorly compacted, damp, dark brown and black, gravelly,with asphalt chunks, trace fine roots			
			CLAYEY SILT FILL (CL) Poorly compacted, damp,dark gray-brown			
			BOTTOM OF PIT @ 8FEET NO GROUNDWATER ENCOUNTERED			
10						
15						

Project: 8810192-R | Woodward-Clyde Consultants | Figure 20

Project: SANTA CLARA VALLEY WATER DISTRICT
San Jose, California

Log of Exploratory Pit No. 4

Date Excavated : 12-20-88

Remarks :

Type of Excavation : Backhoe

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			Surface Elevation: 192.0			
			GRAVELLY CLAY FILL (CL) Poorly compacted, damp, brown, rubble throughout section, cobbles to 12", asphalt, bricks			
5			SILTY CLAY FILL (CL) Poorly compacted, damp, dark brown to grayish brown, gravelly asphalt chunks, gravel to 3" very difficult digging due to rubble			
10			BOTTOM OF PIT @ 9 FEET NO GROUNDWATER ENCOUNTERED			
15						

Project: 8810192-R | Woodward-Clyde Consultants | Figure 21

Project: SANTA CLARA VALLEY WATER DISTRICT
San Jose, California

Log of Exploratory Pit No. 5

Date Excavated : 12-20-88

Remarks :

Type of Excavation : Backhoe

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			Surface Elevation:193.7			
	1		SILTY CLAY FILL (CL) Poorly compacted, damp, brown, gravelly, cobbles to 12" tree matter, very difficult digging due to cobbles			
5	2		SILTY CLAY FILL (CL) Poorly compacted, damp, dark brown to black, gravel to 2", tree and root matter, asphalt, cobbles, bricks, fill, difficult digging due to cobbles			
	3		CLAYEY SILT FILL (CL-ML) Poorly compacted, dark olive gray, asphalt and sand stone fragments, wood and roots			
10			BOTTOM OF HOLE @ 9-1/2 FEET NO GROUNDWATER ENCOUNTERED			
15						

Project: 8810192-R | Woodward-Clyde Consultants | Figure 22

Project: SANTA CLARA VALLEY WATER DISTRICT
San Jose, California

Log of Exploratory Pit No. 6

Date Excavated : 12-20-88

Remarks :

Type of Excavation : Backhoe

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			Surface Elevation: 193.3			
			CLAYEY GRAVEL FILL (CL-GC) Poorly compacted, damp, brown, large gravel and boulders encountered			
5			CLAYEY SILT FILL (CL- ML) Poorly compacted, damp, gray and brown, sandy, occasional gravel, some root matter			
10			BOTTOM OF PIT @ 9 FEET NO GROUNDWATER ENCOUNTERED			
15						

Project: SANTA CLARA VALLEY WATER DISTRICT
San Jose, California

Log of Exploratory Pit No. 7

Date Excavated : 12-20-88 Remarks :

Type of Excavation : Backhoe

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			Surface Elevation:193.5			
	1		GRAVELLY CLAY FILL (CL) Poorly compacted, damp, brown, gravel to 2", cobbles, boulders, rubble, bricks			
	2		CLAYEY SILT FILL (ML) Damp, tan and gray, sandy			
5						
	3		SILTY CLAY (CH) "SLIMES" Soft, moist, gray and tan, organic tree matter			
			BOTTOM OF PIT @ 8 FEET NO GROUNDWATER ENCOUNTERED			
10						
15						

Project: 8810192-R | Woodward-Clyde Consultants | Figure 24

Project: SANTA CLARA VALLEY WATER DISTRICT
San Jose, California

Log of Exploratory Pit No. 8

Date Excavated : 12-20-88

Remarks :

Type of Excavation : Backhoe

Surface Elevation: 192.7

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
	1		GRAVELY CLAY FILL (CL) Poorly compacted, damp, brown, asphalt, cobbles to 10", asphalt chunks to 3 feet			
5	2		CLAYEY SILT FILL (ML) Poorly compacted, damp, olive-gray, some gravel			
	3		SILTY CLAY (CH) "SLIMES" Soft, moist, tan-gray, occasional root and organic matter			
10			BOTTOM OFPIT @ 9-1/2 FEET NO GROUNDWATER ENCOUNTERED			
15						

Project: Guadalupe River Improvements
South of Blossom Hill Road
San Jose, California

Log of Boring No.1

Date Drilled: 9 October 1973 **Hammer Weight:** 265 lb

Type of Boring: 4 in. rotary **Remarks:**

Surface Elevation 184 ft

Depth, Ft.	Samples	Blows/Ft.	DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength, psf
			S A N D Y S I L T (ML) Loose, Moist, Tan			
	1	Push	S I L T Y C L A Y (CH) "Slimes" Very Soft, Wet, Tan and Gray	79	53	270
5	2	Push		88	49	120
10	3	Push		83	52	420
			▽ Water Level at time of drilling			
			Soft			
15	4	Push		59	63	790
			S A N D Y G R A V E L, clayey (GP-GC) Dense, Brown			
20	5	50				
			Sandier			
25	6	80				
			Coarser Gravel			
30			Bottom of Boring			

Job No. JS12954 | WOODWARD-LUNDGREN & ASSOCIATES | Figure 2

Project: Guadalupe River Improvements
South of Blossom Hill Road
San Jose, California

Log of Boring No. 2

Date Drilled: 10 October 1973 **Hammer Weight:** 265 lb

Type of Boring: 4 in. Rotary **Remarks:**

Surface Elevation 183 ft

Depth, Ft.	Samples	Blows/Ft.	DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength, psf
	1	Push	S I L T Y C L A Y (CH) "Slimes" Soft, Wet, Tan and Gray (shrinkage cracks) Very Soft	106	43	80
5						
	2	Push		96	46	170
10			Water Level at time of drilling			
	3	40/6"	S A N D Y G R A V E L (GP) Dense, Gray			
15						
			S A N D Y G R A V E L, clayey (GP-GC) Dense, Brown			
20	4	83				
25	5	65	Coarse Gravel			
30						
	6	28				

Job No. JS12954 | WOODWARD-LUNDGREN & ASSOCIATES | Figure 3

Project: Guadalupe River Improvements
South of Blossom Hill Road
San Jose, California

Log of Boring No.2

Depth, Ft.	Samples	Blows/Ft.	DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength, psf
35			S A N D Y C L A Y (CL) Stiff, Light Brown			
			S A N D Y G R A V E L, clayey (GP-GC) Dense, Brown			
40	7	110				
			Bottom of Boring			
45						
50						
55						
60						
65						

Job No. JS12954 | WOODWARD-LUNDGREN & ASSOCIATES | Figure 4

Project: Guadalupe River Improvements
South of Blossom Hill Road
San Jose, California

Log of Boring No.3

Date Drilled: 11 October 1973 **Hammer Weight:** 140 lb & 343 lb*

Type of Boring: 4 in. rotary **Remarks:** *Slip-Jar Hammer

Surface Elevation 189 ft

Depth, Ft.	Samples	Blows/Ft.	DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength, psf
	1	20	S A N D Y S I L T (ML) Fill, poorly compacted, Damp, Brown w/gravel, asphalt and concrete rubble	12	108	
5			G R A V E L L Y C L A Y (CL) Fill, moderately compacted, Moist, Gray and Brown			
	2	Push	S I L T Y C L A Y (CH) "Slimes" Very Soft, Wet, Gray and Brown (occasionally very silty)	67	59	160
10						
	3	Push		69	58	160
15			▽ Water Level at time of drilling			
	4	Push		80	51	440
20			S A N D Y G R A V E L, clayey (GP-GC) Dense, Brown, occasionally very coarse			
25	5	51/6"*				
30	6	60/6"*				
	7	69				

Job No. JS 12954 WOODWARD-LUNDGREN & ASSOCIATES Figure 5

Project: Guadalupe River Improvements
South of Blossom Hill Road
San Jose, California

Log of Boring No.5

Date Drilled: 10-17-73 **Hammer Weight:** 140 lb; 343 lb*

Type of Boring: 4 in. rotary **Remarks:** *Slip-Jar Hammer

Depth, Ft.	Samples	Blows/Ft.	DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength, psf
			Surface Elevation 190 ft			
	1	10	S I L T Y C L A Y (CL) Fill, poorly compacted, Damp, Dark Brown w/occasional coarse gravel	11	114	
5	2	Push	S I L T Y C L A Y (CH) "Slimes" Very Soft, Wet, Tan and Gray w/occasional clayey silt lenses	77	53	160
10	3	Push		77	55	390
15			Soft			
	4	Push		47	72	530
20	5	Push		67	58	650
			S A N D Y G R A V E L, clayey (GP-GC) Dense, Brown			
			Clayey sand lense			
25	6	58*				
			Coarse gravel			
30	7	50/3"*				

Job No. JS12954 | WOODWARD-LUNDGREN & ASSOCIATES | Figure 9

Project: Guadalupe River Improvements
South of Blossom Hill Road
San Jose, California

Log of Boring No.6

Date Drilled: 15 October 1973 **Hammer Weight:** 140 lb; 343 lb*

Type of Boring: 4 in. rotary **Remarks:** *Slip-Jar Hammer

Depth, Ft.	Samples	Blows/Ft.	DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength, psf
			Surface Elevation 188 ft			
			S I L T Y C L A Y (CL) Fill, poorly compacted, Damp, Dark Brown w/asphalt and concrete rubble			
			S A N D Y S I L T (ML)			
	1	1	Poorly compacted, Moist, Light Brown	76	54	380
5						
	2	Push	S I L T Y C L A Y (CH) "Slimes" Very Soft, Wet, Tan and Gray	74	56	
10						
	3	Push		93	48	110
						Water Level at time of drilling
15			▽			
	4	Push		49	72	280
20						
	5	Push		69	59	420
			S A N D Y G R A V E L, clayey (GP-GC) Dense, Brown occasionally very coarse			
25						
	6	71*	Finer gravel			
30						
	7	72*	Coarser gravel			

Job No. JS12954 | WOODWARD-LUNDGREN & ASSOCIATES | Figure 11

Project: Guadalupe River Improvements
South of Blossom Hill Road
San Jose, California

Log of Boring No.7

Date Drilled: 18 October 1973 **Hammer Weight:** 140 lb; 343 lb*

Type of Boring: 4 in. rotary **Remarks:** *Slip-Jar Hammer

Surface Elevation 193 ft

Depth, Ft.	Samples	Blows/Ft.	DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength, psf
			GRAVELLY CLAY (CL) Fill, moderately compacted, Moist, Brown			
	1	14	SANDY SILT (ML) Fill, poorly compacted, Moist, Brown	29	87	
			Wet, sandier			
5	2	10		27	85	
			CLAYEY GRAVEL (GC) Moderately compacted, Moist, Dark Brown w/asphalt and wood			
10	3	55				
			Coarse gravel			
15	4	75/6"				
			SANDY CLAY (CL) Fill, poorly compacted, Wet, Gray and Brown			
	5	13				
20	6	23*	SILTY CLAY (CL) Fill, moderately compacted, Wet, Dark Gray	31	88	2170
			Gravelly			
			Bottom of Boring			
25						
30						

Job No. JS12954 | WOODWARD-LUNDGREN & ASSOCIATES | Figure 13

Project: Guadalupe River Project (Channel Improvement)

Log of Boring No. 9

Date Drilled: 15 October 1973 **Hammer Weight:** 140 lb; 343 lb*

Type of Boring: 4" Rotary **Remarks:** *Slip-Jar Hammer

Depth, Ft.	Samples	Blows/Ft.	DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength, psf
			Surface Elevation 190 ft			
	1	62	S A N D Y G R A V E L (GW-GC) Dense, Damp, Brown (Slightly clayey)			
			⊤ Sandier			
5	2	58	S A N D Y G R A V E L (GW) Dense, Damp, Gray and Brown			
			S A N D Y G R A V E L, clayey (GW-GC) Dense, Damp, Brown occasionally very coarse			
10	3	80/6"				
15	4	52*		▽ Water Level on 11/2/73 ▽ Water Level on 10/17/73		
20	5	50/3"*	⊤ Coarse gravel, slightly higher clay content			
25	6	57*				
30	7	50/6"*				

Job No. JS12954 | WOODWARD-LUNDGREN & ASSOCIATES | Figure 18

Project: Guadalupe River Project (Channel Improvement)

Log of Boring No. 9

Depth, Ft.	Samples	Blows/Ft.	DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength, psf
35	8	65*	S A N D Y G R A V E L, clayey (GP-GC)			
40	9	53/6"*				
45						
50	10	57/6"*				
55						
60	11	60/3"*				
			Bottom of Boring			
65						

Job No. JS12954 WOODWARD-LUNDGREN & ASSOCIATES Figure 10

Project: Guadalupe River Project (Channel Improvement)

Log of Boring No. 10

Date Drilled: 17 October 1973 **Hammer Weight:** 140 lb; 343 lb*

Type of Boring: 4 in. Rotary **Remarks:** *Slip-Jar Hammer

Depth, Ft.	Samples	Blows/Ft.	DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength, psf
			Surface Elevation 190 ft			
	1	53	S I L T Y C O A R S E S A N D (SM) Medium Dense, Damp, Brown w/some gravel			
			S I L T Y G R A V E L (GM) Dense, Damp, Brown (slightly clayey)			
5	2	50	S A N D Y G R A V E L (GW-GM) Dense, Damp, Gray and Brown			
10	3	78	S A N D Y G R A V E L, clayey (GP-GC) Dense, Damp, Brown			
			Lower clay content, wet			
15	4	70/6"				
20	5	80/6"*				
			Slightly higher clay content			
25	6	99*				
			Coarse Gravel			
30	7	70/2"*				

Water Level ▽ on 11/2/73

Job No. JS12954 | WOODWARD-LUNDGREN & ASSOCIATES | Figure 20

Project: Guadalupe River Project (Channel Improvement)

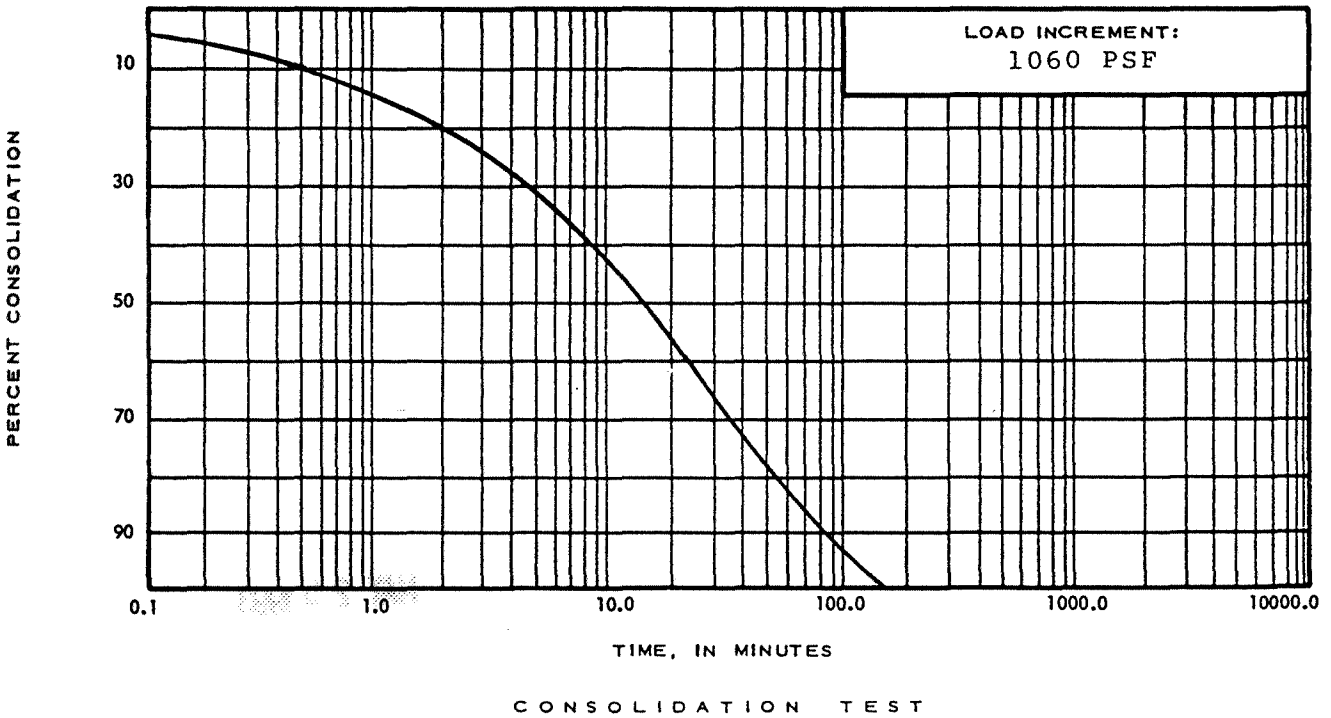
Log of Boring No. 10

Depth, Ft.	Samples	Blows/Ft.	DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength, psf
35	8	127/11"*	S A N D Y G R A V E L, clayey (GP-GC)			
40	9	Pitcher Barrel	(GP)			
45						
50	10	Pitcher Barrel				
55	11	Pitcher Barrel	(GP-GC)			
			Bottom of Boring			
60						
65						

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SAMPLE NO.	SUMMARY OF TEST RESULTS					
1 - 3	SPECIFIC GRAVITY	MOISTURE CONTENT, (%)	DRY DENSITY, (PCF)	PERCENT OF SATURATION, (%)	HEIGHT (IN.)	DIAMETER (IN.)
INITIAL	2.76	96.1	47.2	99.7	1.0057	2.43
FINAL		64.1	62.2	99.9	.7629	





CONSOLIDATION TEST

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Figure 40